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Vol. 4, No. 1

RESEARCH PROJECT CONTROL SYSTEM (RPCS)

STATUS SUMMARY REPORT

RESEARCH RESULTS UTILIZATION
DATA COVERING THREE QUARTERS FROM JULY 1981 - MARCH 1982

OFFICE OF NUCLEAR REGULATORY RESEARCH
UNITED STATES NUCLEAR REGULATORY COMMISSION

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OFFICE OF NUCLEAR REGULATORY RESEARCH
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

I

PREFACE

Please retain this copy of NUREG-0435. This will be the last complete issue published in the series. It contains a compilation of all Research Information Letters (RILs) issued from 1974 to the present. Future issues will contain updated information on new RILs issued during the quarter and RILs (regardless of issue date) on which user offices have submitted comments.

TABLE OF CONTENTS

DESCRIPTION

PART NO.

1.0 INTRODUCTION

2.0 SUMMARY OF IMPACT OF RESEARCH INFORMATION LETTERS (RIL'S) ON THE REGULATORY PROCESS

3.0 LIST OF ISSUED RIL'S

INTRODUCTION

1.0 INTRODUCTION

THIS REPORT ON 'RESEARCH RESULTS UTILIZATION' PROVIDES STATUS AND CONTROL INFORMATION CONCERNING THE UTILIZATION OF RESEARCH RESULTS IN THE REGULATORY POLICIES AND PRACTICES OF THE NRC.

RESEARCH INFORMATION LETTERS -- (RIL'S) ARE PREPARED BY RES TO TRANSMIT RESEARCH RESULTS TO NRC USER OFFICES UPON COMPLETION OF A SUBSTANTIAL, COHERENT AND REASONABLY COMPLETE BODY OF EXPERIMENTAL AND/OR ANALYTICAL RESEARCH WORK. A RIL MAY COVER MATERIAL DEVELOPED FROM MORE THAN ONE RESEARCH PROJECT. THE USER/PROGRAM OFFICE(S) IN THE NRC REVIEW THE INFORMATION CONTAINED IN THE RIL AND CONSIDER ITS UTILIZATION IN THE REGULATORY PROCESS. SECTION 3.0 OF THIS REPORT LISTS THE RIL'S ISSUED TO DATE, TOGETHER WITH AN IDENTIFICATION OF THE RESEARCH PROGRAM MANAGER AND THE RESEARCH PROGRAM ELEMENT WHICH GENERATED THE RIL. THE POTENTIAL APPLICABILITY OF EACH RIL TO THE REGULATORY PROCESS IS ALSO IDENTIFIED HERE, AND COMMENTS FROM THE COGNIZANT RES AND USER OFFICE STAFF ARE SUMMARIZED WHICH RELATE TO THE EXPECTED IMPACT OF THE REPORTED RIL'S ON THE REGULATORY PROCESS. WHERE DEEMED APPROPRIATE BY MUTUAL AGREEMENT BETWEEN RES AND OTHER INVOLVED PROGRAM OFFICES, A POSITION PAPER MAY BE PREPARED TO INFORM THE COMMISSION ABOUT THE POTENTIAL APPLICATION OF RESEARCH RESULTS. BRIEFINGS MAY BE CONDUCTED FOR THE COMMISSION, THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS) OR OTHER APPROPRIATE GROUPS. PRESS RELEASES MAY ALSO BE MADE, AS APPROPRIATE. THESE EVENTS ARE SCHEDULED AND TRACKED IN THIS SECTION.

RES IS RESPONSIBLE FOR DISTRIBUTING EACH NEW RIL TO COGNIZANT OFFICES AS THEY ARE ISSUED. RES AND OTHER COGNIZANT PROGRAM OFFICES ARE OBLIGATED TO COLLECT, REVIEW, AND FORWARD APPROPRIATE INFORMATION RELATING TO RILS AND ASSOCIATED FOLLOW-UP ACTIONS TO RES. RES IS RESPONSIBLE FOR REFLECTING NEW INFORMATION IN THIS PUBLICATION AND PRODUCTION AND DISTRIBUTION OF THIS PUBLICATION ON A QUARTERLY SCHEDULE.

ALL COMMENTS SHOULD BE FORWARDED IN WRITING TO:

CHIEF, PROGRAM AND ADMINISTRATIVE
SERVICES BRANCH
OFFICE OF NUCLEAR REGULATORY RESEARCH
MAIL STOP 1130 SS

SUMMARY OF IMPACT OF RESEARCH INFORMATION LETTERS (RIL'S) ON THE REGULATORY PROCESS

3

BEST DOCUMENT AVAILABLE

*** SUMMARY OF IMPACT OF RILS ON THE REGULATORY PROCESS ***

RIL NO.	INCREASED UNDERSTANDING OF PHENOMENON	TECH BASIS LICENSING REVIEW	REGU-LATION	REG. GUIDES	TECH. SPECS	STD. DEVELOP.	STANDARD FORMAT & CONTENT	STANDARD REVIEW PLAN	INSPEC. PROGRAM	LICENSEE REPORTING REQUIREMENT
74-001	YES	.	.	.	.	.	.	.	.	.
74-002	SOME	POSSIBLE	YES	POSSIBLE	.	.	.	.	.	.
74-003	YES	.	.	.	.	.	.	.	.	.
74-004	YES	YES	.	.	.	.	.	.	.	.
76-005	YES	.	.	.	.	.	.	.	.	.
76-006	SOME	.	.	.	.	.	.	.	.	.
76-007	YES	.	.	.	.	.	.	.	.	.
77-008	YES	POSSIBLE	POSSIBLE	POSSIBLE	.	.	POSSIBLE	.	.	.
77-009	YES	POSSIBLE	POSSIBLE	POSSIBLE	.	.	POSSIBLE	.	.	.
77-010	YES	YES	.	.	.	.	.	.	.	.
77-011	POSSIBLE	POSSIBLE	.	.	.	.	.	.	.	.
77-012	YES	YES	.	.	.	.	.	.	.	.
77-013	YES	YES	.	YES	YES	YES	.	YES	.	.
77-014	YES	.	.	YES	.	YES	YES	YES	.	.
77-015	YES	.	.	YES	.	YES	.	.	.	.
77-016	YES	YES	.	.	.	.	.	.	.	.
78-017	YES	YES	.	.	.	.	.	.	.	.
78-018	POSSIBLE	POSSIBLE	.	.	.	.	.	.	.	.
78-019	POSSIBLE	.	.	.	.	.	.	.	.	.
78-020	.	YES	YES	YES	.	YES	.	.	YES	.
78-021	YES	POSSIBLE	.	.	.	.	.	.	.	.
78-023	.	POSSIBLE	POSSIBLE	POSSIBLE	.	.	.	.	POSSIBLE	.
78-024	.	POSSIBLE	POSSIBLE	POSSIBLE	.	.	.	.	POSSIBLE	.
78-025	SOME	.	.	.	.	.	.	.	.	.

*** SUMMARY OF IMPACT OF RILS ON THE REGULATORY PROCESS ***

RIL NO.	INCREASED UNDERSTANDING OF PHENOMENON	TECH BASIS LICENSING REVIEW	REGU- LATION	REG. GUIDES	TECH. SPECS	STD. DEVELOP.	STANDARD FORMAT & CONTENT	STANDARD REVIEW PLAN	INSPEC. PROGRAM	LICENSEE REPORTING REQUIREMENT
78-026	YES	YES	.	.	.	.	.	.	.	.
78-027	.	.	.	.	.	.	.	.	.	.
78-028	YES	YES	.	.	.	.	.	.	.	.
78-029	.	.	.	.	.	.	.	.	.	.
78-030	YES	YES	.	.	.	.	.	.	.	.
78-031	.	.	.	.	.	.	.	.	.	.
78-032	YES	YES	YES	.	.	.	.	.	.	.
78-033	YES	YES	YES	.	.	.	.	.	.	.
78-034	YES	YES	.	.	.	.	.	.	.	.
78-035	.	.	.	.	.	.	.	.	.	.
78-036	YES	YES	.	.	.	.	.	.	.	.
78-037	.	.	.	.	.	POSSIBLE	.	.	.	.
78-038	.	.	.	.	.	.	.	.	.	.
78-039	.	.	.	.	.	.	.	.	.	.
78-040	.	.	.	.	.	.	.	.	.	.
78-041	.	YES	YES	YES	.	YES	.	.	.	.
78-042	.	.	.	.	.	.	.	.	.	.
79-043	.	.	.	.	.	.	.	.	.	.
79-044	YES	YES	.	.	.	.	.	.	.	.
79-045	.	.	.	.	.	.	.	.	.	.
79-046	.	.	.	YES	.	YES	.	.	.	.
79-047	.	.	.	.	.	.	.	.	.	.
79-048	YES	POSSIBLE	POSSIBLE	YES	.	.	.	.	.	.
79-049	.	.	.	YES	.	.	.	.	.	.

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5

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OFFICE OF NUCLEAR REGULATORY RESEARCH
RESEARCH PROJECT CONTROL SYSTEM

*** SUMMARY OF IMPACT OF RILS ON THE REGULATORY PROCESS ***

RIL NO.	INCREASED UNDERSTANDING OF PHENOMENON	TECH BASIS LICENSING REVIEW	REGU-LATION	REG. GUIDES	TECH. SPECS	STD. DEVELOP.	STANDARD FORMAT & CONTENT	STANDARD REVIEW PLAN	INSPEC. PROGRAM	LICENSEE REPORTING REQUIREMENT
79-050	.	.	.	.	.	.	.	.	.	.
79-051	.	.	.	.	.	.	.	.	.	.
79-052	.	.	.	.	.	.	.	.	.	.
79-053	.	.	.	.	.	.	.	.	.	.
79-054	.	.	.	.	.	.	.	.	.	.
79-055	.	.	.	.	.	.	.	.	.	.
79-056	.	.	.	.	.	.	.	.	.	.
79-057	.	.	.	.	.	.	.	.	.	.
79-058	.	.	.	.	.	.	.	.	.	.
79-059	.	.	.	.	.	.	.	.	.	.
79-060	YES	POSSIBLE	POSSIBLE	YES	.	.	.	.	.	.
79-061	.	.	.	.	.	.	.	.	.	.
79-062	YES	YES	POSSIBLE	YES	.	YES	.	.	.	.
79-063	.	.	.	.	.	.	.	.	.	.
79-064	YES	YES	POSSIBLE	YES	.	.	.	.	.	.
79-065	YES	YES	POSSIBLE	YES	.	YES	.	.	.	.
79-066	YES	POSSIBLE	POSSIBLE	YES	.	.	.	.	.	.
79-067	.	.	.	.	.	.	.	.	.	.
79-068	YES	YES	YES	.	.	YES	.	.	.	.
79-069	YES	YES	POSSIBLE	YES	.	YES	.	.	.	.
79-070	YES	POSSIBLE	POSSIBLE	YES	.	.	.	.	.	.
79-071	YES	POSSIBLE	POSSIBLE	YES	.	.	.	.	.	.
79-072	YES	YES	POSSIBLE	YES	.	YES	.	.	.	.
79-073	YES	YES	.	YES	YES	.	.	.	.	.

*** SUMMARY OF IMPACT OF RILS ON THE REGULATORY PROCESS ***

RIL NO.	INCREASED UNDERSTANDING OF PHENOMENON	TECH BASIS LICENSING REVIEW	REGU-LATION	REG. GUIDES	TECH. SPECS	STD. DEVELOP.	STANDARD FORMAT & CONTENT	STANDARD REVIEW PLAN	INSPEC. PROGRAM	LICENSEE REPORTING REQUIREMENT
79-074	.	.	.	NO	.	NO	NO	YES	.	.
79-075	YES	YES	YES	YES	.	.	.	.	.	.
79-076	YES	YES	YES	POSSIBLE	POSSIBLE	POSSIBLE	.	YES	.	.
79-077	YES	YES	YES	YES	.	.	.	.	.	.
79-078	.	.	.	.	.	.	.	.	.	.
79-079	YES	YES	YES	POSSIBLE	.	POSSIBLE	.	POSSIBLE	.	.
80-080	.	.	.	.	.	.	.	.	.	.
80-081	.	.	.	.	.	.	.	.	.	.
80-082	.	.	.	.	.	.	.	.	.	.
80-083	.	.	.	.	.	.	.	.	.	.
80-084	.	.	.	.	.	.	.	.	.	.
80-085	YES	YES	.	.	.	YES	.	.	.	.
80-086	.	.	.	.	.	.	.	.	.	.
80-087	.	.	.	.	.	.	.	.	.	.
80-088	.	.	.	.	.	.	.	.	.	.
80-089	.	.	.	.	.	.	.	.	.	.
80-090	.	.	.	.	.	.	.	.	.	.
80-091	.	.	.	.	.	.	.	.	.	.
80-092	.	.	.	.	.	.	.	.	.	.
80-093	.	.	.	.	.	.	.	.	.	.
80-094	.	.	.	.	.	.	.	.	.	.
80-095	.	.	.	.	.	.	.	.	.	.
80-096	.	.	.	.	.	.	.	.	.	.
80-097	.	.	.	.	.	.	.	.	.	.

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*** SUMMARY OF IMPACT OF RILS ON THE REGULATORY PROCESS ***

RIL NO.	INCREASED UNDERSTANDING OF PHENOMENON	TECH BASIS LICENSING REVIEW	REGU-LATION	REG. GUIDES	TECH. SPECS	STD. DEVELOP.	STANDARD FORMAT & CONTENT	STANDARD REVIEW PLAN	INSPEC. PROGRAM	LICENSEE REPORTING REQUIREMENT
80-098	.	.	.	.	.	.	.	.	.	.
80-099	.	.	.	.	.	.	.	.	.	.
80-100	.	.	.	.	.	.	.	.	.	.
80-101	.	.	.	.	.	.	.	.	.	.
80-102	.	.	.	YES	.	.	.	.	.	.
80-103	.	.	.	.	.	.	.	.	.	.
80-104	.	.	.	.	.	.	.	.	.	.
80-105	.	.	.	.	.	.	.	.	.	.
80-106	.	.	.	.	.	.	.	.	.	.
80-107	.	.	.	.	.	.	.	.	.	.
80-108	.	.	.	.	.	.	.	.	.	.
80-109	.	.	YES	.	.	.	.	.	.	.
80-110	.	.	.	.	.	.	.	.	.	.
80-111	.	.	.	.	.	.	.	.	.	.
80-112	.	.	.	.	.	.	.	.	.	.
80-113	.	.	.	YES	.	.	.	YES	YES	.
81-114	.	.	.	.	.	.	.	.	.	.
81-115	.	.	.	.	.	.	.	.	.	.
81-116	.	.	.	.	.	.	.	.	.	.
81-117	.	.	.	.	.	.	.	.	.	.
81-118	.	.	.	.	.	.	.	.	.	.
81-119	.	.	.	.	.	.	.	.	.	.
81-120	.	.	.	.	.	.	.	.	.	.
81-121	YES	.	.	.	.	.	.	.	.	.

*** SUMMARY OF IMPACT OF RILS ON THE REGULATORY PROCESS ***

RIL NO.	INCREASED UNDERSTANDING OF PHENOMENON	TECH BASIS LICENSING REVIEW	REGU-LATION	REG. GUIDES	TECH. SPECS	STD. DEVELOP.	STANDARD FORMAT & CONTENT	STANDARD REVIEW PLAN	INSPEC. PROGRAM	LICENSEE REPORTING REQUIREMENT
81-122	YES	YES	.	.	.	.	.	.	.	.
81-123	YES	.	YES	.	.	.	.	.	YES	.
81-124	.	.	YES	.	.	YES	.	.	.	.
81-125	YES	.	YES	.	.	.	.	.	.	.
81-126	YES	.	.	.	.	.	.	.	.	.
81-127	YES	YES	.	.	.	.	.	.	.	.
81-128	YES	.	.	.	.	.	.	.	.	.
82-129	YES	.	YES	.	.	.	.	.	.	.
82-130	YES	YES	.	.	.	.	.	.	.	.

BEST DOCUMENT AVAILABLE

ISSUED RIL'S

RIL NO: 74-001 DATE ISSUED: 03/19/74 RIL TITLE: ORNL V-5 INTERMEDIATE VESSEL TEST RESULTS

RESEARCH REVIEW GROUP NO.: 1-20 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

ORNL V-5 INTERMEDIATE VESSEL TEST RESULTS (ORNL HSST PROGRAM)

RES COMMENTS

EXPERIMENTAL EVIDENCE THAT A "SAFE" FAILURE MODE (LEAK-BEFORE-BREAK) FOR REACTOR PRESSURE VESSELS MAY EXIST, WAS REPORTED FOR THE FIRST TIME. TESTS ON THE V-5 INTERMEDIATE VESSEL AT ORNL DEMONSTRATED THAT A LEAK OCCURRED INSTEAD OF A FRACTURE BREAK WHEN THE VESSEL WAS HEATED TO 190 F AND PRESSURIZED TO 26,600 PSI. FURTHER ANALYTICAL STUDY TO GENERALIZE THIS RESULT IS UNDERWAY.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/21/78 ACTUAL RESP. DATE: 08/21/78 USER OFFICE REVIEWER: B. GRIMES

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE RESULTS OF THIS TEST ADDED TO THE STAFF'S UNDERSTANDING OF FRACTURES ORIGINATING AT FLAWS IN NOZZLE CORNERS OF HEAVY SECTION STEEL VESSELS. IF LEAK-BEFORE-BREAK COULD BE DEMONSTRATED UNDER ALL REASONABLY CONCEIVABLE CONDITIONS AND CIRCUMSTANCES, IT WOULD DEMONSTRATE THAT CURRENT LICENSING POSITIONS ARE VERY CONSERVATIVE.

*** NRR : IMPACT OF RESULTS ***

WHILE ADDING TO OUR UNDERSTANDING OF VESSEL FAILURE MODES, THERE HAS BEEN NO DEFINITIVE IMPACT ON LICENSING AT THIS TIME.

*** NRR : COMMENTS AND REMARKS ***

THE OPINIONS EXPRESSED IN THE RIL REGARDING LEAK-BEFORE-BREAK ARE ENCOURAGING BUT NEED FURTHER SUBSTANTIATION BEFORE CURRENT LICENSING POSITIONS CAN BE RELAXED.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/13/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: P. RANDALL

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR PRESSURE VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APPENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 74-002 **DATE ISSUED**: 05/24/74 **RIL TITLE**: SEISMOTECTONIC MAP OF THE EASTERN UNITED STATES

RESEARCH REVIEW GROUP NO.: 3-02 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

SEISMOTECTONIC MAP OF THE EASTERN UNITED STATES

RES COMMENTS

RIL 2 REPORTS A COMPILATION OF EARTHQUAKE FAULT DATA FOR THE EASTERN UNITED STATES. THESE DATA ARE USED BY LICENSE APPLICANTS IN PREPARATION OF MATERIAL FOR PRELIMINARY SAFETY ANALYSIS REPORTS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/27/77 ACTUAL RESP. DATE: 09/27/77 USER OFFICE REVIEWER: R. DENISE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RESEARCH DEVELOPED LIMITED SEISMOTECTONIC PROVINCES MAPPING OF THE EASTERN UNITED STATES AIMED AT IMPLEMENTING APPENDIX A REQUIREMENTS FOR DETERMINING SEISMIC DESIGN FOR NUCLEAR FACILITIES.

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH ADDED VERY LITTLE TO OUR KNOWLEDGE OF EARTHQUAKE PROCESSES IN THE EASTERN UNITED STATES WHICH COULD BE USED TO IMPLEMENT APPENDIX A REQUIREMENTS.

*** NRR : COMMENTS AND REMARKS ***

CURRENT EARTHQUAKE MONITORING AND TECTONIC STUDIES SHOULD BE SYNTHESIZED TO DEVELOP AN APPLICABLE SEISMOTECTONIC MAP.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/13/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS STUDY IS PRESENTLY USED AS GUIDANCE IN ASSESSING TECTONIC PROVINCES AND SEISMICITY IN LICENSING CASE REVIEWS IN THE EASTERN UNITED STATES. THIS STUDY, AS WELL AS ONGOING STUDIES, WILL EVENTUALLY BE USED TO OFFER GUIDANCE ON A REGIONAL BASIS THROUGH REGULATORY GUIDES.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

RIL NO: 74-003 **DATE ISSUED**: 08/07/74 **RIL TITLE**: ORNL V-7 INTERMEDIATE VESSEL TEST RESULTS

RESEARCH REVIEW GROUP NO.: 1-20 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

ORNL V-7 INTERMEDIATE VESSEL TEST RESULTS (ORNL HSST PROGRAM)

RES COMMENTS

ADDITIONAL EXPERIMENTAL EVIDENCE IS DEMONSTRATED THAT A "SAFE" FAILURE MODE FOR REACTOR PRESSURE VESSELS MAY EXIST, NAMELY, "LEAK-BEFORE-BREAK". THESE RESULTS SUPPORT EARLIER RESULTS REPORTED IN RIL #1. IN THIS TEST, THE FLAW WAS 13-INCHES LONG AND 5-INCHES DEEP IN THE 6-INCH THICK PRESSURE VESSEL WALL. THE VESSEL WAS ABLE TO SUSTAIN TWICE THE DESIGN LOAD PRIOR TO PENETRATION OF THE FLAW THROUGH THE REMAINING THIN LIGAMENT OF VESSEL MATERIAL. THIS RESEARCH CONTRIBUTES TO OUR UNDERSTANDING OF VESSEL FAILURE MODE. THIS INCREASED UNDERSTANDING SUPPORTS THE NRR STAFF IN ITS REVIEW EFFORTS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 11/07/77 ACTUAL RESP. DATE: 09/09/77 USER OFFICE REVIEWER: B. GRIMES

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE TEST RESULTS HAVE BEEN USEFUL IN ESTIMATING THE MARGIN OF SAFETY, IN TERMS OF FLAW SIZE, FOR A LARGE FLAW IN A HEAVY SECTION STEEL VESSEL TESTED AT UPPER SHELF TEMPERATURES. WHILE CRACK ADVANCEMENT THROUGH THE REMAINING WALL LIGAMENT WAS IN THE STABLE TEARING MODE, PRODUCING A LEAK, AND PRESSURE TO CAUSE LEAKAGE WAS MORE THAN TWICE THE VESSEL DESIGN PRESSURE, THESE RESULTS MAY HAVE BEEN INDUCED BY THE SPECIAL EFFECTS OF THE TEST GEOMETRY.

*** NRR : IMPACT OF RESULTS ***

WHILE ADDING TO OUR UNDERSTANDING OF VESSEL FAILURE MODES, THERE HAS BEEN NO DEFINITIVE IMPACT ON LICENSING AT THIS TIME.

*** NRR : COMMENTS AND REMARKS ***

THE OPINIONS EXPRESSED IN THE RIL REGARDING LEAK-BEFORE-BREAK ARE ENCOURAGING BUT NEED FURTHER SUBSTANTIATION BEFORE CURRENT LICENSING POSITIONS CAN BE RELAXED.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/03/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: P. RANDALL

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR PRESSURE VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APPENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 74-004 **DATE ISSUED**: 09/10/74 **RIL TITLE**: MAP SHOWING RECENCY OF FAULTING IN COASTAL SO. CALIF.

RESEARCH REVIEW GROUP NO.: 3-02 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

MAP SHOWING RECENCY OF FAULTING IN COASTAL SOUTHERN CALIFORNIA

RES COMMENTS

RIL 4 COVERED FAULTING IN COASTAL SOUTHERN CALIFORNIA AND IS REFERRED TO BY NRR WHEN CONSIDERING SEISMIC SAFETY QUESTIONS REGARDING PLANTS IN THE AREA COVERED.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/27/77 ACTUAL RESP. DATE: 09/27/77 USER OFFICE REVIEWER: R. DENISE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

TO BE USED IN SELECTING SITES FOR NUCLEAR FACILITIES AND FOR REGIONAL INPUT TO STAFF REVIEW OF NUCLEAR FACILITY APPLICATIONS.

*** NRR : IMPACT OF RESULTS ***

WORK PROVIDED NEW KNOWLEDGE OF THE DISTRIBUTION OF ACTIVE FAULTS IN COASTAL CALIFORNIA. HAS PROVIDED INPUT TO OUR REVIEW OF DIABLO CANYON AND OTHER SITES.

*** NRR : COMMENTS AND REMARKS ***

WORK HAS LARGELY BEEN COMPLETED. NO EXTENSION IS ANTICIPATED.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/13/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE OBJECT OF THIS STUDY WAS TO PRODUCE DATA DESCRIBING THE RELATIONSHIP BETWEEN EARTHQUAKE MAGNITUDES AND DIMENSIONS OF FAULT DISPLACEMENT. THIS STUDY, ALONG WITH OTHERS, IS USED AS GUIDANCE IN ASSESSING "CAPABLE FAULTS" IN LICENSING REVIEWS. RIL #4 PROVIDED A MAP WHICH UPDATED INFORMATION ON FAULTING IN COASTAL SOUTHERN CALIFORNIA.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

RIL NO: 76-005 **DATE ISSUED**: 06/28/76 **RIL TITLE**: CONFIRMATORY PRESSURE VESSEL TEST UNDER PNEUMATIC LOADING

RESEARCH REVIEW GROUP NO.: 1-20 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

CONFIRMATORY PRESSURE VESSEL TEST UNDER PNEUMATIC LOADING (ORNL HSST PROGRAM)

RES COMMENTS

RIL'S 1, 3 & 5 REPORTED THE RESULTS FROM THE HEAVY SECTION STEEL TECHNOLOGY PROGRAM WHICH SHOWED THAT THE ANALYTICAL METHODS FOR PREDICTING FLAW INITIATION AND CRACK ARREST IN REACTOR PRESSURE VESSELS HAVE BEEN WELL VALIDATED. THESE VALIDATED ANALYTICAL METHODS (LINEAR ELASTIC FRACTURE MECHANICS AND ELASTIC-PLASTIC FRACTURE MECHANICS) ALLOW A PREDICTION OF THOSE CONDITIONS UNDER WHICH FLAWS IN PRESSURE VESSEL STEELS CAN CAUSE FAILURE OF THE VESSEL. THIS PROVIDES THE NRR STAFF WITH A NEW TECHNIQUE FOR SETTING SAFE LIMITS FOR NORMAL OPERATION AND FOR ABNORMAL AND ACCIDENT SITUATIONS TO REDUCE THE LIKELIHOOD OF PRESSURE VESSEL FAILURE.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 10/21/77 ACTUAL RESP. DATE: 12/16/77 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE INTERMEDIATE TEST VESSELS, ITV-7 AND ITV-7A UNDER SUSTAINED LOADING DEMONSTRATED THAT BOTH THE VESSELS RESPONDED TO PNEUMATIC LOADING ESSENTIALLY AS THEY HAD TO HYDRAULIC LOADING. EARLIER EXPERIENCE OF A RAPID CRACK EXTENSION IN THE GAS PIPE LINE WAS INHIBITING THE ACRS COMMITTEE ABOUT THE RESULTS OF ITV-TEST UNDER HYDRAULIC LOADING. HENCE, THE PNEUMATIC LOAD TEST WAS SUGGESTED.

*** NRR : IMPACT OF RESULTS ***

THESE TESTS SHOW THAT THE VESSELS UNDER SUSTAINED LOADING BEHAVED SIMILARLY TO HYDRAULIC LOADING, AND THE RESULTS ARE APPLICABLE TO THE EVALUATION OF THE BEHAVIOR OF REACTOR PRESSURE VESSELS UNDER SUSTAINED LOAD. THE TWO VESSEL TESTS THAT RUPTURED, WITHSTOOD PRESSURE 2.15 TO 2.75 TIMES DESIGN PRESSURE. THE TEST PRESSURES WERE ABOVE ASME B & P V CODE ALLOWABLE FOR FAULTED CONDITIONS.

*** NRR : COMMENTS AND REMARKS ***

TESTS DEMONSTRATE THE LEAK WITHOUT BURST.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/13/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: P. RANDALL

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR PRESSURE VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APPENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

RIL NO: 76-006 DATE ISSUED: 10/12/76 RIL TITLE: CRITIQUE OF BOARD-HALL MOD FOR THERM DETON IN UO2-NA SYS

RESEARCH REVIEW GROUP NO.: 2-06 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

A CRITIQUE OF THE BOARD-HALL MODEL FOR THERMAL DETONATIONS IN THE UO2-NA SYSTEM

RES COMMENTS

THIS CRITIQUE OF THE BOARD-HALL THEORY FOR THERMAL EXPLOSIONS IN A URANIUM OXIDE-SODIUM SYSTEM REINFORCED THE BELIEF THAT SUCH DETONATIONS ARE OF LOW PROBABILITY. THE CRITIQUE HAS BEEN USED AS AN AID IN ANSWERING ACRS CONCERNS ABOUT THE POSSIBILITY OF ENERGETIC FUEL-COOLANT INTERACTIONS IN ADVANCED REACTORS AND WAS EMPLOYED IN SUPPORTING NRR'S POSITION IN THE EVALUATION OF THE PRELIMINARY SAFETY ANALYSIS REPORT FOR THE CLINCH RIVER BREEDER REACTOR.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/09/77 ACTUAL RESP. DATE: 09/09/77 USER OFFICE REVIEWER: W. GAMMILL

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

ESTIMATES OF THERMAL DETONATION ENERGIES ARE DIRECTLY RELEVANT IN LICENSING DECISIONS RELATED TO CONTAINMENT REQUIREMENTS FOR LMFBR, PARTICULARLY KINETIC ENERGY RELEASE, SYSTEM DAMAGE AND RADIOACTIVITY RELEASES. THE RIL TRANSMITTED A CRITIQUE OF THE BOARD AND HALL (UKAEA) THEORY FOR THERMAL EXPLOSIONS IN THE UO2-SODIUM SYSTEM. THIS INDEPENDENT THEORETICAL ASSESSMENT IS USEFUL IN REINFORCING THE CURRENT NRR BELIEF THAT SUCH DETONATIONS ARE OF LOW PROBABILITY AND THAT FURTHER EXPERIMENTAL EFFORT IS REQUIRED.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THE CRITIQUE ARE MINIMAL IN THIS ON-GOING TECHNOLOGICAL EXPLORATION, EXCEPT AS NOTED ABOVE IN REINFORCING THE IDENTIFIED PERCEPTIONS AND NEED FOR EXPERIMENTS. SUCH WORK, INDEPENDENT ASSESSMENTS OF IDENTIFIED AND POTENTIAL SIGNIFICANT SAFETY ISSUES, SHOULD CONTINUE.

*** NRR : COMMENTS AND REMARKS ***

THE INITIAL EFFORT OF AN EXPERIMENTAL AND ANALYTICAL EVALUATION OF THE BOARD AND HALL MODEL OF THERMAL EXPLOSIONS WAS UNDERTAKEN BY DPM AT THE REQUEST OF THE ACRS (ACRS REQUEST DATED JULY 9, 1975 FOR BOARD AND HALL REVIEW). NOTE DPM RESPONSE TO THIS REQUEST IN A LETTER FROM R. P. DENISE TO M. LIBARKIN, ACRS, DATED OCTOBER 24, 1975. THE PHENOMENON IS APPLICABLE IN THE ONGOING REVIEW OF THE FFTF REACTOR. NRR HAS BEEN IN CONTINUING CONTACT WITH RES STAFF ON THE RESEARCH PROGRAMS PERTAINING TO INVESTIGATIONS ON THE BOARD AND HALL EFFECT, AND THE GENERAL SUBJECT OF THERMAL EXPLOSIONS, AND MAINTAINS COGNIZANCE OF SUCH WORK IN THE U. S. AND OTHER COUNTRIES.

21

RIL NO: 76-007 DATE ISSUED: 08/25/76 RIL TITLE: SIMMER CODE FOR ANAL OF CORE DISRUPT ACCIDENTS IN LMFBR'S

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THE SIMMER CODE FOR ANALYSIS OF HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS IN LMFBR'S

RES COMMENTS

THE SIMMER CODE IS DESIGNED TO PREDICT THE MOTION OF FAST REACTOR CORES DURING POTENTIAL CORE DISRUPTIVE ACCIDENTS. A TRIAL VERSION OF THIS CODE WAS MADE AVAILABLE TO NRC'S LICENSING STAFF AND HAS SUPPORTED NRC BRANCH POSITIONS ON THE ANALYSIS OF CORE DISRUPTIVE ACCIDENTS FOR CL NCH RIVER BREEDER REACTOR LICENSING CONSIDERATIONS. SIMMER IS RECOGNIZED AS AN IMPORTANT FIRST STEP IN THE DEVELOPMENT OF A MECHANISTIC CODE CAPABLE OF DESCRIBING PHENOMENA NEEDED TO ASSESS CORE DISRUPTIVE ACCIDENTS IN LIQUID METAL FAST BREEDER REACTORS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/09/77 ACTUAL RESP. DATE: 09/09/77 USER OFFICE REVIEWER: W. GAMMILL

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE SUBJECT RIL ANNOUNCED THE AVAILABILITY OF THE SIMMER-1 CODE. THE SIMMER-1 CODE IS RECOGNIZED BY NRR AS AN IMPORTANT FIRST STEP IN THE DEVELOPMENT OF A MECHANISTIC CODE CAPABLE OF DESCRIBING PRECRITICALITY, TRANSITION PHASE PHENOMENA, AND WORK ENERGY PARTITION, ALL VITAL TO ASSESSING CORE DISRUPTIVE ACCIDENTS IN LMFBR'S.

*** NRR : IMPACT OF RESULTS ***

THERE IS NO IMPACT SINCE RESULTS USING THE SIMMER-1 CODE ARE NOT SUFFICIENTLY SUBSTANTIATED TO BE USED DIRECTLY IN THE LICENSING DECISIONS FOR LMFBR'S. IT IS ANTICIPATED THAT FURTHER CODE DEVELOPMENT, AND THE PERFORMANCE OF EXPERIMENTS WHICH CONFIRM THE COMPUTATIONAL MODELS, WILL YIELD A TOOL WHICH WILL BE USEFUL IN REACHING SIGNIFICANT LICENSING DECISIONS.

*** NRR : COMMENTS AND REMARKS ***

NRR VIEWS THE SIMMER PROGRAM AS AN IMPORTANT LONG TERM EFFORT TO DESCRIBE THERMAL AND MECHANICAL CORE DISRUPTION ACCIDENT SEQUENCES. NRR ALSO SEES NEAR-TERM BENEFIT IN USING SIMMER TO BETTER UNDERSTAND KEY PHENOMENA, AND THE INTEGRATION OF THESE PHENOMENA INTO AN ACCIDENT SEQUENCE. SIMMER ALSO HAS THE BENEFIT OF BEING LARGELY INDEPENDENT OF ERDA SPONSORED WORK. NRR HAS BEEN IN CONSTANT COMMUNICATION WITH ARSR AND HAD INITIATED A SMALL T.A. EFFORT WHICH MAKES USE OF SIMMER. NRR STAFF HAVE ATTENDED SIMMER WORKSHOPS AND BRIEFINGS ON 9/14-15/76, 4/19/77 AND 7/21-22/77. NRR CORRESPONDENCE RELATED TO SIMMER AND SIMMER-RELATED WORK CONDUCTED BY RSR:

1. TO SAUL LEVINE, RES FROM B. RUSCHE, NRR, "LMFBR SAFETY RESEARCH PROGRAM PLAN", 3/15/77.
2. TO L. S. RUBENSTEIN FROM R. P. DENISE, "DEGREE OF SUPPORT FOR RESEARCH PROGRAMS FOR ADVANCED REACTORS", 7/6/77 (CC. TO C. KELBER).
3. TO E. G. CASE FROM R. P. DENISE, "NRR COMMENTS TO ACRS ON ARSR PROGRAM", 7/15/77.
4. TO SAUL LEVINE, RES, FROM E. CASE, NRR, "RES INFORMATION ON THE UNDERSTANDING OF CDA ENERGETICS IN LMFBR'S".

RIL NO: 77-008 DATE ISSUED: 01/31/77 RIL TITLE: DECAY HEAT DATA APPLICABLE TO LOCA EVALUATION

RESEARCH REVIEW GROUP NO.: 1-11 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

DECAY HEAT APPLICABLE TO LOCA EVALUATION

RES COMMENTS

RECENT CALCULATIONS AND EXPERIMENTS WERE PERFORMED TO DETERMINE A BEST ESTIMATE OF THE VALUE OF THE RESIDUAL (DECAY) HEAT GENERATED IN NUCLEAR FUEL AFTER SHUTDOWN. THE VALUE CHOSEN FOR RESIDUAL HEAT RATE PLAYS A VERY IMPORTANT PART IN PREDICTING THE PERFORMANCE OF ECC SYSTEMS. RESULTS INDICATE THAT THE DECAY HEAT RATE CURRENTLY USED HAS A 27% MARGIN OVER THE NEWLY DETERMINED VALUE. THIS INDICATES A SIGNIFICANT CONSERVATISM IN CURRENT LICENSING BASES AND THEY ARE NOW BEING REEXAMINED. RIL'S 8 & 9 ARE BOTH UNDER REVIEW BY NRR FOR POSSIBLE INCLUSION IN A MODIFICATION TO THE EMERGENCY CORE COOLING SYSTEMS (ECCS) RULE PROVIDED IN APPENDIX K OF 10 CFR 50. THESE RIL'S REPORTED ON COMPLETED RESEARCH PROJECTS IN FISSION PRODUCT DECAY HEAT AND ZIRCALOY OXIDATION WHICH RESULTED IN DATA BASES AND CORRELATIONS WHICH INDICATE THAT THOSE IN CURRENT USE IN THE ECCS RULE ARE HIGHLY CONSERVATIVE. A COMMISSION PAPER WAS PREPARED (SECY 77-368) ON JULY 1, 1977, TO PRESENT STAFF PROGRESS ON A PROPOSED ACTION PLAN REGARDING POSSIBLE MODIFICATION TO THE ECCS RULE. THE COMMISSION PAPER (SECY 78-26) PRESENTING THE PROPOSED ACTION PLAN WAS PREPARED ON JANUARY 18, 1973.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/17/78 ACTUAL RESP. DATE: 08/21/78 USER OFFICE REVIEWER: D. ROSS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

1. NEW DATA IS BEING CONSIDERED AS PARTIAL BASIS FOR MODIFICATION OF PRESENT ECCS RULE (10 CFR 50.46 AND APPENDIX K). PROPOSED OPTIONS FOR RULE CHANGE INCLUDE ACCEPTABILITY OF NEW DECAY HEAT DATA IN ECCS LICENSING CALCULATIONS.
2. NEW DATA WILL BE INCORPORATED IN "BEST ESTIMATE" ANALYSIS CODES. THESE CODES ARE INTENDED TO BE USED IN PROBABILISTIC ASSESSMENT OF SAFETY MARGINS.

*** NRR : IMPACT OF RESULTS ***

1. NEW DATA CONFIRMS MARGINS ALLOTTED IN PRESENT ECCS RULE ARE CONSERVATIVE.
2. IF ACCEPTED FOR USE IN LOCA LICENSING CALCULATIONS, VENDORS COULD USE ADDITIONAL MARGIN IN DESIGN. (I.E., INCREASE PEAK KW/FT, ETC.).

*** NRR : COMMENTS AND REMARKS ***

THE COMMISSION APPROVED THE PROPOSED ACTION PLAN TO MODIFY APPENDIX K (SECY 78-26). NRR AND RES ARE PREPARING A REQUEST TO SD TO INITIATE RULEMAKING TO MODIFY APPENDIX K.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/01/77 ACTUAL RESP. DATE: 09/01/77 USER OFFICE REVIEWER: V. PANCIERA

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THESE STUDIES PROVIDE INFORMATION NECESSARY TO ASSESS THE DEGREE OF CONSERVATISM OF THE DECAY HEAT ASSUMPTIONS IN 10 CFR 50 APPENDIX K (ECCS EVALUATION MODELS).

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 77-009 **DATE ISSUED**: 03/14/77 **RIL TITLE**: HIGH TEMP OXIDATION OF ZIRCALOY FUEL CLADDING IN STEAM

RESEARCH REVIEW GROUP NO.: 1-08 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

HIGH TEMPERATURE OXIDATION OF ZIRCALOY FUEL CLADDING IN STEAM

RES COMMENTS

THE REPORTED RESULTS IMPROVE OUR UNDERSTANDING OF THE BEHAVIOR OF ZIRCALOY FUEL CLADDING IN AN ENVIRONMENT REPRESENTED BY A LOSS OF COOLANT ACCIDENT (LOCA). THEY INDICATE THAT THERE WOULD BE SIGNIFICANTLY LESS DEPTH OF EMBRITTLEMENT IN THE FUEL CLADDING WALL, CALCULATED FOR ANY POSTULATED LOCA AND MORE WALL MATERIAL WILL BE LEFT WHICH IS CAPABLE OF SUSTAINING LOADS LATER IN THE SEQUENCE OF SUCH AN ACCIDENT. THIS INFORMATION, TOGETHER WITH DATA ON THE RATE OF GROWTH OF OXIDE & OXYGEN - STABILIZED LAYERS IN CLADDING, PROVIDES A MORE SCIENTIFIC BASE FOR ESTABLISHING FUEL CLAD EMBRITTLEMENT CRITERIA FOR EMERGENCY CORE COOLING SYSTEM ACCEPTANCE. THESE RESULTS CONFIRM THAT THERE IS A DEGREE OF CONSERVATISM IN THE EVALUATION MODEL BEING USED BY THE REGULATORY STAFF FOR CALCULATING THE OXIDATION OF ZIRCALOY DURING A POSTULATED LOCA. THIS INFORMATION IS BEING CONSIDERED AS A PARTIAL BASIS FOR MODIFICATION OF THE PRESENT ECCS RULE (10 CFR 50, APPENDIX K). RIL'S 8 & 9 ARE BOTH UNDER CONSIDERATION BY NRR FOR POSSIBLE INCLUSION IN A MODIFICATION TO THE EMERGENCY CORE COOLING SYSTEMS (ECCS) RULE PROVIDED IN APPENDIX K OF 10 CFR 50. THESE RIL'S REPORTED ON COMPLETED RESEARCH PROJECTS IN FISSION PRODUCT DECAY HEAT AND ZIRCALOY OXIDATION WHICH RESULTED IN DATA BASES AND CORRELATIONS WHICH INDICATE THAT THOSE IN CURRENT USE IN THE ECCS RULE ARE HIGHLY CONSERVATIVE. A COMMISSION PAPER WAS PREPARED (SECY 77-368) ON JULY 1, 1977, TO PRESENT STAFF PROGRESS ON A PROPOSED ACTION PLAN REGARDING POSSIBLE MODIFICATION TO THE ECCS RULE. THE COMMISSION PAPER (SECY 78-26) PRESENTING THE PROPOSED ACTION PLAN WAS PREPARED ON JANUARY 18, 1978. RIL #9 HAS BEEN REVIEWED BY NRR, NMSS, IE, AND SD. THIS MATERIAL WAS INCLUDED IN THE BRIEFING OF THE ACRS FULL COMMITTEE BY NRR IN SEPT. 1977, CONCERNING A POSSIBLE REVISION OF APPENDIX K 10 CFR 50. THE ACRS DISCOURAGED A REVISION OF THE ECCS RULE AT THIS TIME.

BEST DOCUMENT AVAILABLE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/28/77 ACTUAL RESP. DATE: 09/28/77 USER OFFICE REVIEWER: D. ROSS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

1. NEW DATA MAY BE CONSIDERED AS PARTIAL BASIS FOR MODIFICATIONS OF PRESENT ECCS RULE (10 CFR 50, APPENDIX K).
2. NEW DATA MAY BE USED IN "BEST ESTIMATE" CODES. THESE CODES ARE INTENDED TO BE USED IN PROBABILISTIC ASSESSMENTS OF SAFETY MARGINS.

*** NRR : IMPACT OF RESULTS ***

1. NEW DATA CONFIRMS MARGIN ALLOTTED IN PRESENT ECCS RULE IS CONSERVATIVE.
2. IF ACCEPTED FOR USE IN LOCA LICENSING CALCULATIONS, VENDORS COULD USE ADDITIONAL MARGIN IN DESIGN (I.E., INCREASE PEAK KW/FT).

*** NRR : COMMENTS AND REMARKS ***

THE COMMISSION APPROVED THE PROPOSED ACTION PLAN TO MODIFY APPENDIX K (SECY 78-26). NRR AND RES ARE PREPARING A REQUEST TO SD TO INITIATE RULEMAKING TO MODIFY APPENDIX K.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/13/77 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: V. PANCIERA

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROJECT PROVIDES DATA ON THE AMOUNT OF METAL-WATER REACTION AND HYDROGEN GAS GENERATION FOLLOWING A LOCA AND AIDS IN THE DEVELOPMENT OF REVISIONS TO REGULATORY GUIDE 1.7 AND IN ASSESSING THE CONSERVATISM OF ASSUMPTIONS IN 10 CFR 50 APPENDIX K.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 77-010 DATE ISSUED: 02/25/77 RIL TITLE: PRESSURE VESSEL FAILURE PROBABILITY PREDICTION (OCTAVIA CD.)

RESEARCH REVIEW GROUP NO.: 1-20 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

PRESSURE VESSEL FAILURE PROBABILITY PREDICTION (OCTAVIA CODE)

RES COMMENTS

OCTAVIA IS A COMPUTER CODE FOR PREDICTING FAILURE PROBABILITIES IN REACTOR PRESSURE VESSELS AS A FUNCTION OF TEMPERATURES AND PRESSURES THAT MIGHT OCCUR DURING STARTUP AND SHUTDOWN OPERATIONS. EFFECTS OF MATERIAL PROPERTIES AND OPERATING AGE WERE ALSO INCLUDED. THE RESULTS INDICATED THAT EXISTING SAFETY MARGINS COULD BE SIGNIFICANTLY REDUCED WITH CONTINUED AGING (RESULTING IN RADIATION EMBRITTLEMENT) OF THE REACTOR VESSEL, IF THE RATE OF OCCURRENCE OF OVERPRESSURE EVENTS CONTINUES TO BE SIMILAR TO THAT PREVIOUSLY OBSERVED. FURTHER IMPROVEMENTS IN THE CODE ARE REPORTED ON IN RIL 12. THESE RESULTS WERE USED BY NRR DURING THIS PAST YEAR IN REVIEWING THE PROBABILITY OF FAILURE OF REACTOR PRESSURE VESSELS DUE TO SUCH EVENTS AND TO GIVE GUIDANCE ON PLANT IMPROVEMENTS THAT MAY BE NEEDED. THEY MAY ALSO BECOME THE BASIS FOR REVISING REGULATORY GUIDES OR STANDARDS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/09/77 ACTUAL RESP. DATE: 05/07/77 USER OFFICE REVIEWER: B. GRIMES

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE OCTAVIA COMPUTER CODE HAS BEEN USED TO EVALUATE THE PROBABILITY OF REACTOR VESSEL FAILURE FROM OVERPRESSURE TRANSIENTS WHICH CAN OCCUR DURING PWR OPERATION. THE RESULTS OF THE ANALYSES INDICATED THAT EXISTING SAFETY MARGINS COULD BE SIGNIFICANTLY REDUCED WITH CONTINUED NEUTRON IRRADIATION OF THE REACTOR VESSEL IF THE HISTORICAL FREQUENCY OF OVERPRESSURE EVENTS CONTINUED.

*** NRR : IMPACT OF RESULTS ***

THE ANALYSES ENABLED NRR TO CONFIRM, IN A MORE RIGOROUS, QUANTITATIVE MANNER, INITIAL LICENSING DECISIONS TO REDUCE THE FREQUENCY AND MAXIMUM PRESSURE OF THE TRANSIENTS. THESE DECISIONS RESULTED IN MODIFICATIONS TO OPERATING PROCEDURES AND REDUCING THE FREQUENCY OF TRANSIENTS AND THE INSTALLATION OF PHYSICAL DEVICES TO LIMIT PRESSURES IN OPERATING PLANTS TO THOSE SPECIFIED BY THE PRESSURE-TEMPERATURE LIMITATIONS IN THE TECHNICAL SPECIFICATIONS.

*** NRR : COMMENTS AND REMARKS ***

SEE COMMENTS TO RIL #12.

BEST DOCUMENT AVAILABLE

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 09/13/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: P. RANDALL

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR PRESSURE VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APPENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 77-011 DATE ISSUED: 09/15/77 RIL TITLE: IEEE NUCLEAR RELIABILITY DATA MANUAL

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

IEEE NUCLEAR RELIABILITY DATA MANUAL

RES COMMENTS

A FAILURE RATE DATA MANUAL WAS DEVELOPED WHICH CAN BE USED IN RISK AND RELIABILITY ANALYSIS OF REACTOR SYSTEMS. THE MANUAL CONTAINS FAILURE RATES AND FAILURE MODE INFORMATION FOR OVER 1,000 ELECTRICAL, ELECTRONIC AND SENSING COMPONENTS USED IN NUCLEAR POWER PLANTS. A METHOD IS GIVEN FOR COLLECTING AND PRESENTING RELIABILITY DATA FOR QUANTITATIVE RELIABILITY AND AVAILABILITY OF SAFETY-RELATED NUCLEAR PLANT SYSTEMS. UNCERTAINTY BOUNDS ARE ALSO GIVEN FOR EACH ESTIMATE OF A COMPONENT FAILURE RATE. THIS WORK IS PART OF A CONTINUING EFFORT TO ESTABLISH AN INTERIM DATA BASE FOR USE IN MEETING NRC NEEDS IN THE ELECTRICAL AND ELECTRONIC AREA UNTIL SIGNIFICANT OPERATING DATA ON COMPONENTS USED IN THE NUCLEAR INDUSTRY BECOME AVAILABLE.

OFFICE: MPA IMPACT STATEMENT

SCHED. RESP. DATE: 01/15/78 ACTUAL RESP. DATE: 08/24/78 USER OFFICE REVIEWER: L. ABRAMSON

*** MPA : APPLICATION TO THE REGULATORY PROCESS ***

THE DATA IS DIFFICULT TO INTERPRET BECAUSE OF THE MANY AMBIGUITIES AND INCONSISTENCIES IN THE DATA MANUAL. THE RELATION OF THE AGGREGATED FAILURE RATES TO THE COMPONENT FAILURE RATES IS NOT MADE CLEAR AND THEY ARE OFTEN INCONSISTENT. IN PARTICULAR, THE USE OF GEOMETRIC AVERAGING IS NOT JUSTIFIED AND LEADS TO INCONSISTENT RESULTS. THE WAY IN WHICH HIGH AND LOW FAILURE RATES ADD UP IS NOT CONSISTENT WITH THEIR STATED INTERPRETATION AS 95TH AND 5TH PERCENTILES OF THE FAILURE RATE DISTRIBUTION. THE EQUALITY OF THE HIGH VALUE TO THE MAX VALUE IN MANY TABLES IS ALSO INCONSISTENT WITH THIS INTERPRETATION. THE FAILURE MODE TYPES AND DEFINITIONS GIVEN EXCLUDE SUDDEN PARTIAL FAILURES AND GRADUAL COMPLETE FAILURES, BOTH OF WHICH ARE EXPERIENCED IN PRACTICE.

*** MPA : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** MPA : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 10/25/77 ACTUAL RESP. DATE: 10/25/77 USER OFFICE REVIEWER: R. TEDESCO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE SUBJECT RIL ANNOUNCED THE AVAILABILITY OF A FAILURE RATE DATA MANUAL. THIS DATA SUPPLEMENTS OTHER SOURCES OF RELIABILITY DATA SUCH AS THE REACTOR SAFETY STUDY. SUCH DATA ARE BEING USED IN RELIABILITY STUDIES THAT SUPPORT OR PROVIDE THE BASES FOR LICENSING REQUIREMENTS.

*** NRR : IMPACT OF RESULTS ***

THE FIRST STUDIES USING THIS DATA HAVE NOT YET BEEN COMPLETED AND THEREFORE THE IMPACT CANNOT YET BE DETERMINED.

*** NRR : COMMENTS AND REMARKS ***

THIS DATA MANUAL PROVIDES THE STRUCTURE FOR INCORPORATING NEW OR REVISED DATA AS IT BECOMES AVAILABLE. THE MANUAL NOW CONTAINS UNDIFFERENTIATED HARD AND SOFT DATA WHICH IS A SERIOUS IMPEDIMENT TO THE APPLICATION OF THIS DATA. THEREFORE, CONTINUING WORK IS REQUIRED TO INCREASE THE CONTENT OF HARD DATA BY INCORPORATING THE DATA DEVELOPED THROUGH SUCH PROGRAMS AS NPRDS.

RIL NO: 77-012 **DATE ISSUED**: 06/16/77 **RIL TITLE**: MODIFICATIONS TO PRESSURE VESSEL FAILURE PROBABILITY PREDICT

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

MODIFICATIONS TO PRESSURE VESSEL FAILURE PROBABILITY PREDICTION (OCTAVIA CODE)

RES COMMENTS

MODIFICATIONS IN THE OCTAVIA COMPUTER CODE REPORTED IN RIL #10 WERE MADE. THESE MODIFICATIONS INCLUDE A CAPABILITY TO HANDLE RESIDUAL STRESS IN A REACTOR PRESSURE VESSEL WHICH CAN EITHER BE CONSTANT, OR VARY WITH FLAW SIZE; THE CODE USER CAN IMPOSE AN UPPER BOUND ON THE VESSEL TOUGHNESS AND THE CODE HAS THE CAPABILITY TO HANDLE UNCERTAINTIES IN THE TOUGHNESS. USING THE MODIFIED OCTAVIA CODE, THE MEDIAN FAILURE PROBABILITY FOR THE SURRY REACTOR PRESSURE VESSEL WAS CALCULATED TO BE 5 X 10-7 PER VESSEL YEAR FOR AN OPERATING TEMPERATURE OF 110 DEGREES C AND THE CURRENT AGE OF APPROXIMATELY 2.5 YEARS. THE FAILURE PROBABILITY INCREASES TO 3 X 10-5 PER VESSEL YEAR AFTER 40 YEARS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/16/77 ACTUAL RESP. DATE: 09/23/77 USER OFFICE REVIEWER: B. GRIMES

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

(SEE RIL #10)

*** NRR : IMPACT OF RESULTS ***

(SEE RIL #10)

*** NRR : COMMENTS AND REMARKS ***

THIS IS A MODIFICATION OF RESULTS TRANSFERRED BY RIL #10, 02-25-77. THE ANALYSES USING THE OCTAVIA CODE ARE COMPLETE. THE GENERIC POSITIONS REGARDING OVERPRESSURIZATION PROTECTION SYSTEMS HAVE BEEN DEVELOPED AND ARE DOCUMENTED IN NUREG-0224, 'REACTOR VESSEL PRESSURE TRANSIENT PROTECTION FOR PRESSURIZED WATER REACTORS.' IMPLEMENTATION OF THE POSITIONS ARE UNDERWAY.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 08/16/77 ACTUAL RESP. DATE: 02/21/78 USER OFFICE REVIEWER: P. RANDALL

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR PRESSURE VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APPENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS ***

SEE COMMENTS FOR RIL #10.

RIL NO: 77-013 DATE ISSUED: 11/11/77 RIL TITLE: RESIDUAL STRESSES IN WELDS

RESEARCH REVIEW GROUP NO.: 1-20 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

RESIDUAL STRESSES IN WELDS

RES COMMENTS

A VERIFIED MODEL IS PRESENTED FOR PREDICTING RESIDUAL STRESSES RESULTING FROM THE WELDING OF PIPES, AND THE ESTIMATION OF RESIDUAL STRESSES RESULTING FROM WELD REPAIRS OF REACTOR PRESSURE VESSELS. THE MODEL CAN BE USED IN THE LICENSING PROCESS TO AID IN THE EVALUATION OF CRACKING THAT HAS OCCURRED IN GIRTH-BUTT WELDS IN PIPING. IT SHOULD ALSO PROVE TO BE USEFUL IN ANY SAFETY EVALUATION OF PROPOSED REPAIRS BY WELD BUILDUP IN THE CORNER REGIONS OF PRESSURE VESSEL NOZZLES AFTER CRACKS HAVE BEEN REMOVED, AND IN VESSEL WELD REPAIRS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/28/78 ACTUAL RESP. DATE: 08/14/78 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE AXISOL CODE COULD BE USED AS AN AID IN EVALUATING RESIDUAL STRESSES IN FLUID HEAD-PROCESS PIPE WELDS OF CONTAINMENT PENETRATION ASSEMBLIES AND GIRTH BUTT WELDS IN PIPING. IT SHOULD ALSO PROVE USEFUL AS AN AID IN DEVELOPING THE NECESSARY DECISIONAL INFORMATION IN ANY SAFETY EVALUATION OF PROPOSED WELD REPAIRS.

*** NRR : IMPACT OF RESULTS ***

THE COMPUTER CODE AXISOL COULD EVENTUALLY BE USED AS A DESIGN TOOL BY BOTH GOVERNMENT AND INDUSTRY, TO IMPROVE WELDING TECHNIQUES AND PROCEDURES. THE RESULTS OF THIS PROGRAM SHOULD BF BROUGHT TO THE ATTENTION OF VARIOUS ASME GROUPS ENGAGED IN PREPARING CODES AND STANDARDS ON WELDED FABRICATION AND INSPECTION PROCEDURES. THOROUGH DISCUSSION AND EVALUATION BY SUCH GROUPS AND CONSIDERABLE TRIAL USE BY INDUSTRY IS NECESSARY BEFORE FULL APPLICATION OF THE CODE IN THE LICENSING PROCESS WOULD BE APPROPRIATE. THE INABILITY OF THE CODE TO TAKE INTO ACCOUNT THE EFFECTS OF POST-WELD HEAT TREATMENT, AT THIS TIME, IS A DRAWBACK IN UTILIZING THE CODE IN THE LICENSING PROCESS.

*** NRR : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 02/11/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: H. COBB

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR PRESSURE VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 77-014 **DATE ISSUED**: 11/09/77 **RIL TITLE**: PHYSICAL SEPARATION CRITERIA FOR ELECTRICAL CABLE TRAYS

RESEARCH REVIEW GROUP NO.: 1-23 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

PHYSICAL SEPARATION CRITERIA FOR ELECTRICAL CABLE TRAYS (HORIZONTAL OPEN SPACE CONFIGURATION)

RES COMMENTS

THE ADEQUACY OF THE REQUIRED SPACING OF ELECTRICAL CABLE TRAYS AT NUCLEAR POWER PLANTS WAS EXAMINED TO PREVENT THE SPREAD OF CABLE FIRES. RESULTS INDICATE THAT CURRENTLY USED CRITERIA FOR CABLE TRAY SEPARATION APPEAR TO BE ADEQUATE FOR ELECTRICALLY-INITIATED FIRES, BUT THAT CHANGES MAY BE REQUIRED FOR FIRES DUE TO EXTERNAL IGNITION SOURCES. THIS WORK IS APPLICABLE TO A VERIFICATION OF REGULATORY GUIDE 1.75, "PHYSICAL INDEPENDENCE OF ELECTRIC SYSTEMS". EXPOSURE FIRE TESTING EMPLOYING EXTERNAL FUEL SOURCES WAS CONDUCTED TO PROVIDE DATA FOR THE DEVELOPMENT OF CURRENT NRC STAFF POSITION AS DOCUMENTED IN THE APPENDIX A TO THE BRANCH TECHNICAL POSITION APCSB 9.5-1, "GUIDELINES FOR FIRE PROTECTION FOR NUCLEAR POWER PLANTS" AND IN THE DRAFT REGULATORY GUIDE 1.120, "FIRE PROTECTION GUIDELINES FOR NUCLEAR POWER PLANTS."

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/09/78 ACTUAL RESP. DATE: 04/26/78 USER OFFICE REVIEWER: R. TEDESCO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE RIL PROVIDES RESULTS OF A COMPLETED PORTION OF THE NRC FIRE PROTECTION RESEARCH PROGRAM CONDUCTED AT THE SANDIA LABORATORIES REGARDING THE EFFECTS OF CABLE TRAY SEPARATION ON THE PROPAGATION OF ELECTRICALLY INITIATED AND EXPOSURE FIRES.

*** NRR : IMPACT OF RESULTS ***

THE INTRODUCTORY PARAGRAPH OF RIL #14 STATES THAT THE RESULTS OF THE SANDIA PROGRAM INDICATE THAT "CURRENTLY USED CRITERIA FOR CABLE TRAY SEPARATION APPEAR TO BE ADEQUATE FOR ELECTRICALLY INITIATED FIRES BUT THAT CHANGES MAY BE REQUIRED FOR FIRES DUE TO EXTERNAL IGNITION SOURCES." RES NOTED IN A CONVERSATION ON NOVEMBER 11, 1977 THAT THE SPECIFIC POINT RAISED IN THAT PARAGRAPH IS DIRECTED TO THE ADEQUACY OF SOLE RELIANCE ON THE SEPARATION CRITERIA OF REGULATORY GUIDE 1.75 FOR PROTECTION AGAINST EXPOSURE FIRES. THE FIRE PROTECTION CRITERIA DEVELOPED BY THE STAFF SINCE THE BROWNS FERRY FIRE HAVE RECOGNIZED THAT RELIANCE SHOULD NOT BE PLACED SOLELY ON THE SEPARATION CRITERIA OF REGULATORY 1.75. OUR STAFF REPORT, DATED NOVEMBER 9, 1977 ON "THE QUESTION OF WHETHER THE PETITION OF THE UNION OF CONCERNED SCIENTISTS RAISES MATTERS THAT REQUIRE IMMEDIATE COMMISSION ACTION," INDICATES THE STAFF POSITION THAT THE IEEE-384 AND THE REGULATORY GUIDE 1.75 SEPARATION GUIDELINES, AND THE IEEE-383 FIRE RETARDANCY STANDARDS FOR SAFETY CABLES, BY THEMSELVES ARE NOT SUFFICIENT TO PROTECT AGAINST EXPOSURE FIRES. CONSEQUENTLY WE REQUIRE ADDITIONAL MEASURES FOR FIRE PROTECTION SUCH AS: FIRE BARRIERS BETWEEN REDUNDANT DIVISION CABLE TRAYS; FIRE RETARDANT COATINGS ON CABLING; AUTOMATIC FIRE DETECTION SYSTEMS; AUTOMATIC FIRE EXTINGUISHING SYSTEMS; ADMINISTRATIVE PROCEDURES; AND TRAINING PROGRAMS. THIS POSITION HAS BEEN HELD BY THE STAFF SINCE THE BROWNS FERRY FIRE AND IS REFLECTED IN OUR STANDARD REVIEW PLAN SECTION 9.5.1 (BTP 9.5-1), REVISION. REG. GUIDE 1.120 HAS BEEN ISSUED FOR COMMENT. THUS, EXPOSURE FIRES ARE REQUIRED TO BE CONSIDERED IN THE FIRE PROTECTION PROGRAMS FOR BOTH OPERATING PLANTS AND PLANTS IN THE LICENSING PROCESS. IT SHOULD BE NOTED THAT THE RIL ACKNOWLEDGES THAT FURTHER TESTING WITH ELECTRICALLY INITIATED CABLE TRAY FIRES UNDER DIFFERENT CONDITIONS MAY RESULT IN FULLY DEVELOPED FIRES.

*** NRR : COMMENTS AND REMARKS ***

NRR CONCLUDES, AS DOES RIL #14, THAT THESE RESEARCH RESULTS CONFIRM THE NEED FOR PROTECTION MEASURES IN ADDITION TO THE SEPARATION CRITERIA. SINCE SUCH MEASURES ARE INCLUDED IN OUR PRESENT CRITERIA WE CONCLUDE THAT THE INFORMATION IN RIL #14 DOES NOT INDICATE THE NEED FOR CHANGES IN OUR FIRE PROTECTION GUIDELINES, BUT THAT IT CONFIRMS THE NEED FOR OUR PLANS TO UPDATE REGULATORY GUIDE 1.75.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 03/09/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE TESTS HAVE CONFIRMED THE VALIDITY OF GUIDELINES IN REGULATORY GUIDE 1.120 FOR SEPARATING REDUNDANT SAFETY SYSTEM CABLING BY RATED FIRE BARRIERS. THE TESTS HAVE CONFIRMED THE VALIDITY OF SEPARATION CRITERIA SPECIFIED IN REGULATORY GUIDE 1.75 ONLY WITH RESPECT TO FIRES RESULTING FROM ELECTRICAL FAILURE WITHIN A CABLE TRAY BUNDLE. HOWEVER, THEY SHOW THE BASIC DEFICIENCIES OF THE SEPARATION REQUIREMENTS WITH RESPECT TO EXPOSURE FIRES COMMON TO MORE THAN ONE REDUNDANT SYSTEM CABLE RUN.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 77-015 **DATE ISSUED**: 12/01/77 **RIL TITLE**: CHARACTERIZATION OF BWR FEEDWATER NOZZLE CORNER CRACKS

RESEARCH REVIEW GROUP NO.: 1-20 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

CHARACTERIZATION OF BWR FEEDWATER NOZZLE CORNER CRACKS

RES COMMENTS

PRESSURE LOADING OF CRACKS IN THE INSIDE CORNER OF FEEDWATER INTAKE NOZZLES FOR BOILING WATER REACTOR (BWR) PRESSURE VESSELS HAVE BEEN CHARACTERIZED. THE CHARACTERIZATION ESTABLISHED THE RELATIONSHIP BETWEEN STRESS-GENERATED PRESSURE AND MEASURABLE CRACK PARAMETERS, IN ORDER TO DETERMINE THE GROWTH OF THE CRACK AND ITS CRITICAL SIZE. THESE RESULTS CAN BE USED TO CHECK THE CALCULATIONS, BASED ON INTERNAL PRESSURE, FOR THE SAFETY ANALYSIS OF BWR FEEDWATER NOZZLE CORNER CRACKS DURING SUBSEQUENT COMBINED COOLING AND UNLOADING. IT HAS BEEN SHOWN THAT UNDER THE MOST SEVERE CONDITIONS, THE CRACK CAN PENETRATE NO MORE THAN 1/3 OF THE PRESSURE VESSEL WALL. THIS MEANS THAT THE VESSEL WILL ALWAYS BE CAPABLE OF RETAINING EMERGENCY COOLING WATER, THUS KEEPING THE CORE COOL AND PROVIDING FOR A SAFE SHUTDOWN. THUS, VESSEL FAILURE IS NOT POSSIBLE FOLLOWING WARM PRESTRESSING UNDER CONDITIONS WHERE COLD EMERGENCY CORE COOLING WATER IS INJECTED INTO THE HOT PRESSURE VESSEL FOLLOWING A LOSS OF COOLANT ACCIDENT.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/20/78 ACTUAL RESP. DATE: 02/21/78 USER OFFICE REVIEWER: B. GRIMES

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

NRR CONCURS THAT THESE DATA CAN BE USED FOR PARTIAL VERIFICATION OF THE APPROXIMATE METHODS USED BY GE IN ESTIMATING THE STRESS INTENSITY FACTORS APPLICABLE TO FEEDWATER AND CRD NOZZLE CRACKS IN BWR REACTOR VESSELS. THEY CAN ALSO BE USED FOR VERIFICATION OF MORE SOPHISTICATED METHODS OF EVALUATION (SUCH AS FINITE ELEMENT ANALYSIS) IF AND WHEN SUCH METHODS ARE DEVELOPED.

*** NRR : IMPACT OF RESULTS ***

WE HAVE MADE A COMPARISON BETWEEN THE GE STRESS INTENSITY CURVE (FIG. 3-26 OF NEDE-21480) FOR THE ONE CASE WHERE A DIRECT COMPARISON CAN BE MADE -- NAMELY, AT AN A/T RATIO SLIGHTLY GREATER THAN 0.50, AS PROVIDED BY FIG. 7 OF THE PROGRESS REPORT. FOR THIS ONE CASE, THERE IS ALMOST EXACT AGREEMENT BETWEEN THE GE CURVE AND THE VPI TEST RESULTS. THE GE CURVE, WHEN CONVERTED TO NORMALIZED STRESS INTENSITY FACTORS, WILL ALSO PRODUCE A CURVE (AS A FUNCTION OF A/T RATIO) WHICH IS QUALITATIVELY SIMILAR TO THAT OF FIG. 7 OF VIP-E-76-25; IN THIS CASE, EXACT CORRESPONDENCE IS NOT TO BE EXPECTED BECAUSE OF THE MATERIAL DIFFERENCE IN THE DIAMETER-TO-THICKNESS RATIOS OF VESSELS INVOLVED. THE CLOSE AGREEMENT BETWEEN THE GE CURVE AND THE TEST RESULT FOR THE ONE CASE WHERE A VALID COMPARISON CAN BE MADE PROVIDES ASSURANCE THAT THE STRESS INTENSITY FACTORS USED BY GE IN THEIR EVALUATION ARE REASONABLE APPROXIMATIONS.

*** NRR : COMMENTS AND REMARKS ***

WE ENCOURAGE THE COMPLETION OF THIS WORK AND PARTICULARLY THE DEVELOPMENT OF VERIFIED ANALYTICAL METHODS WHICH WILL PROVIDE AN ASSURED MEANS FOR FUTURE CALCULATION OF SIF'S FOR CRACKS IN COMPLEX GEOMETRIES (SUCH AS THROUGH THE USE OF FINITE ELEMENT ANALYSIS)

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 04/20/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR PRESSURE VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APPENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 77-016 **DATE ISSUED**: 12/01/77 **RIL TITLE**: WARM PRESTRESSING

RESEARCH REVIEW GROUP NO.: 1-20 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

WARM PRESTRESSING

RES COMMENTS

THE EFFECT OF COLD EMERGENCY CORE COOLING WATER ON HOT REACTOR PRESSURE VESSELS WAS CONSIDERED. THE RESULTING THERMAL SHOCK COULD, UNDER "WORST CASE" CONDITIONS, LEAD TO THE PREDICTION THAT FLAWS IN THE STEEL PRESSURE VESSEL WOULD EXTEND. RESULTS REPORTED HERE PROVIDE A VERIFICATION OF THE "WARM PRESTRESSING" EFFECT WHICH CAN PRECLUDE CRACK EXTENSION WHEN IT OTHERWISE WOULD HAVE BEEN PREDICTED. TO DESCRIBE THIS EFFECT, ONCE A CRACK IS LOADED WHILE THE MATERIAL IS VERY TOUGH, NO RAPID EXTENSION WILL OCCUR.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/02/78 ACTUAL RESP. DATE: 02/14/78 USER OFFICE REVIEWER: B. GRIMES

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

IF "WARM PRESTRESSING" AS DESCRIBED IN THE RIL IS OPERATIVE ON HIGHLY IRRADIATED REACTOR VESSEL STEELS, THIS MECHANISM COULD PROVIDE ADDITIONAL MARGIN IN THE RPV TO ACCOMMODATE THERMAL SHOCK ASSOCIATED WITH ECCS INJECTION DURING A LARGE LOCA.

*** NRR : IMPACT OF RESULTS ***

BY LIMITING CONCERNS REGARDING THERMAL SHOCK TO REACTOR VESSELS TO THOSE TRANSIENTS THAT INVOLVE REPRESSURIZATION OF THE VESSEL, VENDOR ANALYSES AND NRC EVALUATIONS WOULD BE SIMPLIFIED. IT WOULD ALSO PROVIDE AT LEAST A PARTIAL ANSWER TO THE QUESTIONS POSED IN REG. GUIDE 1.2, "THERMAL SHOCK TO REACTOR VESSEL."

*** NRR : COMMENTS AND REMARKS ***

NRR HAS DISCUSSED THE TECHNICAL ASPECTS COVERED BY THIS RIL WITH RES PERSONNEL. RESEARCH REGARDING WARM PRESTRESSING IS STILL UNDERWAY, ESPECIALLY ITS RELEVANCE TO CYLINDRICAL VESSEL WALLS. WHILE IT APPEARS TO BE A PROMISING PHENOMENON FOR LIMITING CRACK EXTENSION DURING A THERMAL SHOCK, THE DATA ARE STILL INSUFFICIENT TO BE USED AS A BASIS FOR LICENSING DECISIONS. A DETAILED TECHNICAL EVALUATION OF THE RESEARCH DESBRIBED IN THE RIL AND THE NRR ASSESSMENT OF ITS RANGE OF APPLICABILITY WILL BE COMPLETED FOLLOWING RECEIPT OF MORE SUBSTANTIAL DATA.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 04/02/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM HAS GENERATED SUBSTANTIAL DATA USED IN PREDICTING IRRADIATION EMBRITTLEMENT AND MARGINS TO FAILURE OF REACTOR VESSELS WHEN FLAWS ARE PRESENT, CONSIDERING MATERIAL PROPERTIES AND LOADINGS. THIS PROGRAM HAS PROVIDED INPUT TO NRC REQUIREMENTS FOR FRACTURE TOUGHNESS OF PRESSURE VESSEL MATERIALS DESCRIBED IN APPENDIX G TO 10 CFR 50 AND CONTRIBUTED DATA USED IN THE ASME CODE WHICH WAS INCORPORATED INTO APPENDIX G. IT HAS ALSO PROVIDED PART OF THE DATA BASE USED IN REGULATORY GUIDE 1.99 CONCERNING THE EFFECT OF COPPER IMPURITIES ON SENSITIVITY OF STEEL TO IRRADIATION AND IS EXPECTED TO PROVIDE A SUBSTANTIAL INPUT FOR FUTURE REVISIONS TO REGULATORY GUIDE 1.99).

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

RIL NO: 78-017 DATE ISSUED: 05/05/78 RIL TITLE: PBF SINGLE ROD-POWER COOLING MISMATCH (PCM) TEST RESULTS

RESEARCH REVIEW GROUP NO.: 1-10 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

POWER BURST FACILITY (PBF) SINGLE ROD-POWER COOLING MISMATCH (PCM) TEST RESULTS

RES COMMENTS

COMPLETED RESEARCH IS REPORTED ON SINGLE FUEL ELEMENTS EXPOSED TO POWER-COOLING MISMATCH (PCM) CONDITIONS IN THE POWER BURST FACILITY (PBF). THE RESULTS ARE OFFERED FOR USE IN DETERMINING POSSIBLE CHANGES IN REQUIRED DEPARTURE-FROM-NUCLEATE-BOILING RATIOS (DMBR'S) FOR ALL COMMERCIAL POWER REACTORS WHICH USE ZIRCALOY-CLAD URANIUM DIOXIDE FUEL RODS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 07/05/78 ACTUAL RESP. DATE: 08/01/78 USER OFFICE REVIEWER: D. HOUSTON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

VARIOUS FUEL FAILURE MECHANISMS AND THE CONSEQUENCES OF FAILURES ARE EVALUATED IN THE SAFETY ANALYSIS OF TRANSIENTS AND ACCIDENTS. DEPARTURE FROM NUCLEATE BOILING (DNB) IS ASSUMED TO PRODUCE FUEL ROD FAILURE AND IS THE FAILURE CRITERION USED FOR MANY LICENSING ANALYSES. PELLET/CLADDING INTERACTION (PCI) CAN ALSO BE A FUEL FAILURE MECHANISM. PBF PROVIDES THE CAPABILITY FOR STUDYING FUEL BEHAVIOR AND FAILURE MECHANISMS UNDER TRANSIENT AND ACCIDENT CONDITIONS.

*** NRR : IMPACT OF RESULTS ***

THE DEMONSTRATED ABILITY OF MOST FUEL RODS TO EXPERIENCE DNB WITHOUT FAILURE SHOWS THAT THE CURRENT DNB CRITERION IS CONSERVATIVE. REQUESTS FOR LESS CONSERVATIVE FAILURE CRITERIA HAVE BEEN MADE BY THE INDUSTRY. TURBINE TRIP WITHOUT BYPASS (TTWOB) AND STEAM LINE BREAK (SLB) ARE NEAR-LIMITING EVENTS IN WHICH DNB IS PREDICTED TO OCCUR MOMENTARILY YET FAILURE BY THIS MECHANISM MAY NOT OCCUR. DEFINITION OF A LESS CONSERVATIVE FAILURE CRITERION FOR THESE EVENTS WOULD RELIEVE THESE LIMITING CONDITIONS. BASED ON THESE PBF RESULTS, NRR WILL GIVE SERIOUS CONSIDERATION TO THESE VENDOR REQUESTS; HOWEVER, APPROVAL OF RELAXED FAILURE CRITERIA WILL BE CONTINGENT UPON THE EVALUATION OF OTHER NON-DNB FAILURE MECHANISMS.

*** NRR : COMMENTS AND REMARKS ***

THE SINGLE ROD PCM TEST RESULTS SHOW THAT THE CURRENT DNB FAILURE CRITERION IS CONSERVATIVE. THE WIDE RANGE OF CLADDING TEMPERATURES DURING DNB WHEN TEST PARAMETERS ARE NEARLY THE SAME PREVENT A QUANTITATIVE ASSESSMENT OF THE MARGIN TO FAILURE. FURTHERMORE, THE PAWEL CLADDING EMBRITTLEMENT CRITERION WOULD NEED ADDITIONAL REVIEW BEFORE A QUANTITATIVE MEASURE OF MARGIN COULD BE USED IN LICENSING MATTERS.

THE PCM TEST SERIES WAS DESIGNED PRIMARILY TO STUDY THE EFFECTS OF DNB. THEREFORE, PELLET/CLADDING INTERACTION (PCI) DATA FROM THESE EXPERIMENTS WERE PROBABLY COMPROMISED BY THE TEST CONDITIONS. FOR EXAMPLE, FUEL EXPOSURE TIME AT POWER, FUEL PRECONDITIONING AND CLADDING TEMPERATURE WERE NOT IDEAL FOR PCI STUDIES.

CONCLUSIONS ON THE SUBJECT OF FUEL FAILURE PROPAGATION DRAWN FROM THE PCM SERIES MAY BE PREMATURE SINCE VENDOR FUEL ROD PRESSURE CRITERIA HAVE BEEN CHANGED. NEW DESIGN CRITERIA, RECENTLY APPROVED BY NRC, ALLOW FOR INTERNAL ROD PRESSURE TO EXCEED THE EXTERNAL SYSTEM PRESSURE DURING NORMAL OPERATION. IN ADDITION, THE FUEL-ROD BEHAVIOR OF A SINGLE ROD IN A COLD SHROUD IS NOT TYPICAL OF FUEL RODS IN A MULTIPLE ARRAY. THE FORTHCOMING BUNDLE TESTS IN PBF SHOULD GIVE MORE INFORMATION ABOUT FAILURE PROPAGATION.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 07/05/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

NO RESPONSE RECEIVED.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

RIL NO: 78-018 DATE ISSUED: 01/09/78 RIL TITLE: FRANTIC COMPUTER CODE

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

FRANTIC COMPUTER CODE

RES COMMENTS

THE FRANTIC COMPUTER CODE IS USED TO CALCULATE THE UNAVAILABILITY OF ANY SYSTEM MODEL. COMPREHENSIVE SURVEILLANCE TESTING EVALUATIONS FOR A SYSTEM ARE POSSIBLE WITH THE INCORPORATION OF TEST DOWNTIMES, TEST INEFFICIENCIES, AND TEST-CAUSED FAILURES IN THE ANALYSIS OF SYSTEM MODELS. THE FRANTIC CODE HAS POTENTIAL SIGNIFICANT APPLICATION IN EVALUATING TECHNICAL SPECIFICATIONS ON TESTING AND ALLOWED DOWNTIMES FOR REACTOR SAFETY SYSTEMS. THE EVALUATIONS CAN BE OF A GENERIC NATURE, OR CAN BE APPLIED TO SPECIFIC PLANT SYSTEMS IF APPLICABLE DATA ARE AVAILABLE.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 01/09/78 ACTUAL RESP. DATE: 11/01/79 USER OFFICE REVIEWER: F. GOLDBERG

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE SUBJECT RIL ANNOUNCED THE AVAILABILITY OF THE FRANTIC COMPUTER CODE. THIS COMPUTER CODE IS RECOGNIZED BY NRR AS AN IMPORTANT TOOL TO QUANTIFY SYSTEM UNAVAILABILITIES. THE FRANTIC COMPUTER CODE IS BEING USED BY SCIENCE APPLICATIONS, INC., TO PERFORM SENSITIVITY STUDIES ON ALLOWABLE OUTAGE TIMES FOR ECCS COMPONENTS AS A PORTION OF THE EFFORT UNDER CONTRACT NO. NRC-03-07-059.

*** NRR : IMPACT OF RESULTS ***

THE SAI CONTRACT EFFORT HAS BEEN COMPLETED. THE FRANTIC CODE WAS UTILIZED TO DETERMINE THOSE FACTORS TO WHICH SYSTEM UNAVAILABILITY IS MOST SENSITIVE INCLUDING, FOR EXAMPLE, TEST DOWNTIME, REPAIR TIME, TEST EFFICIENCY, TEST OVERRIDE CAPABILITIES, POSSIBLE TEST CAUSED FAILURES AND TEST STAGGERING. THE FRANTIC CODE HAS BEEN SHOWN TO BE POTENTIALLY USEFUL IN ESTABLISHING TECHNICAL SPECIFICATIONS FOR SPECIFIC SAFETY SYSTEM DESIGNS, HOWEVER, SAI SUGGESTED THAT ADDITIONAL, MORE COMPLETE AND COMPREHENSIVE ANALYSES BE PERFORMED IN THE FUTURE.

*** NRR : COMMENTS AND REMARKS ***

DOR EXPECTS TO UTILIZE THE FRANTIC COMPUTER CODE, EITHER DIRECTLY OR UNDER TECHNICAL ASSISTANCE CONTRACTS, TO QUANTIFY SYSTEM UNAVAILABILITIES ON SPECIFIC OPERATING PLANTS AS THE NEED ARISES. THE CALCULATIONAL RESULTS MAY AID IN DETERMINING APPROPRIATE LICENSING ACTION. NO POST RIL ACTIVITIES ARE PLANNED.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 01/09/78 ACTUAL RESP. DATE: 11/01/79 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

NO COMMENT.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

RIL NO: 78-019 **DATE ISSUED**: 01/31/78 **RIL TITLE**: GO METHODOLOGY ASSESSMENT

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

GO METHODOLOGY ASSESSMENT

RES COMMENTS

GO PROVIDES A METHOD FOR SYSTEM MODELING AND A COMPUTER CODE TO CALCULATE A PREDICTION OF SYSTEM RELIABILITY. THE STUDY DEMONSTRATES THAT THIS METHOD PROVIDES EQUIVALENT RESULTS TO THOSE OBTAINED FROM FAULT TREE ANALYSIS, WHICH WAS USED IN THE REACTOR SAFETY STUDY. THE MODEL RESEMBLES THE SYSTEM SCHEMATIC OR PIPING DIAGRAM WHICH REDUCES THE BURDEN OF MODELING ALL SYSTEM COMPONENTS. GO HAS A POTENTIAL SIGNIFICANT USE AS A MEANS OF DETERMINING SYSTEM RELIABILITY OR AS A DIVERSE METHOD FOR VERIFYING SYSTEM ANALYSIS PERFORMED USING FAULT TREE OR SIMILAR MODELING TECHNIQUES.

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 03/31/78 ACTUAL RESP. DATE: 11/01/79 USER OFFICE REVIEWER: B. HATTER

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

NO RESPONSE RECEIVED.

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/31/78 ACTUAL RESP. DATE: 11/01/79 USER OFFICE REVIEWER: R. TEDESCO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS METHODOLOGY HAS NOT BEEN AND IS NOT PLANNED TO BE USED IN UPCOMING SAFETY REVIEWS. HOWEVER, EVEN THOUGH THE METHODS HAVE NOT BEEN DIRECTLY APPLIED IN THE LICENSING PROCESS, WE CONSIDER THAT THEIR USE WOULD ADD TO THE GENERAL KNOWLEDGE OF THE NRC STAFF IN THE AREA OF REACTOR SYSTEM RELIABILITY EVALUATION.

*** NRR : IMPACT OF RESULTS ***

THERE HAS BEEN NO IMPACT OF THESE RESULTS TO DATE ON THE LICENSING PROCESS. THE ASSIGNMENT OF RESOURCES TO THIS ACTIVITY HAS BEEN PRECLUDED DUE TO THE NEED TO SERVICE HIGHER PRIORITY TASKS.

*** NRR : COMMENTS AND REMARKS ***

NONE

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 03/31/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

NO COMMENT

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-020 DATE ISSUED: 01/24/78 RIL TITLE: A STUDY OF PHYSICAL PROTECTION EQUIPMENT

RESEARCH REVIEW GROUP NO.: 4-04 0-00 SPONSORING OFFICE(S): I&E

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

A STUDY OF PHYSICAL PROTECTION EQUIPMENT

RES COMMENTS

THE PURPOSE OF THIS STUDY WAS TO PROVIDE THE NRC INSPECTOR, LICENSING REVIEWER AND FIELD EVALUATOR WITH NEW AND IMPROVED METHODS FOR EVALUATING PHYSICAL PROTECTION EQUIPMENT THAT IS IN USE OR PROPOSED FOR USE AT LICENSED NUCLEAR FACILITIES. THE FIVE MAJOR PRODUCTS OF THIS STUDY ARE:

1. A CATALOG OF PHYSICAL PROTECTION EQUIPMENT.
2. A GUIDE FOR EVALUATION OF PHYSICAL PROTECTION EQUIPMENT.
3. A BOOK OF REFERENCE MATERIALS (RELEVANT TO THE EQUIPMENT CATALOG AND THE EVALUATION GUIDE).
4. A SET OF GUIDELINES FOR DEVELOPING A METHODOLOGY TO MEASURE LEVELS OF EFFECTIVENESS FOR A FIXED-SITE PHYSICAL PROTECTION SYSTEM
5. A SUMMARY REPORT, INCLUDING RECOMMENDATIONS FOR FURTHER WORK.

ALL OF THE ABOVE PRODUCTS HAVE BEEN DISTRIBUTED TO THE VARIOUS NRC REGIONAL OFFICES AND ARE PRESENTLY BEING USED BY INSPECTORS AS BASIC REFERENCE DOCUMENTS FOR EVALUATING PHYSICAL PROTECTION EQUIPMENT INSTALLED AT LICENSED NUCLEAR FACILITIES. DATA FROM THESE DOCUMENTS WERE ALSO USED IN THE DEVELOPMENT OF A NEW NRC REGULATORY GUIDE ON INTERIOR INTRUSION DETECTION ALARM SYSTEMS BY THE OFFICE OF STANDARDS DEVELOPMENT. OTHER FEDERAL AGENCIES HAVE REQUESTED THE RESULTS OF THIS STUDY AS A MEANINGFUL COMPENDIUM OF AVAILABLE PHYSICAL PROTECTION EQUIPMENT AND EVALUATION EQUIPMENT TECHNIQUES. THE RESULTS OF THIS STUDY WILL BE USED IN PHASE II OF THIS SAFEGUARDS RESEARCH PROGRAM AS A BASIS FOR EXPANDING AND IMPROVING THE DATA AVAILABLE TO NRC STAFF REGARDING THE CHARACTERISTICS AND EFFECTIVENESS OF COMBINATIONS OF PHYSICAL PROTECTION EQUIPMENT, AND THEIR ASSOCIATED ADMINISTRATIVE AND OPERATIONAL PROCEDURES. THE DIVISION OF DOCUMENT CONTROL HAS BEEN REQUESTED TO PRINT THESE REPORTS FOR DISTRIBUTION ONLY TO OTHER AGENCIES AND NRC STAFF.

OFFICE: IE IMPACT STATEMENT

SCHED. RESP. DATE: 03/31/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: G. WEIS

*** IE : APPLICATION TO THE REGULATORY PROCESS ***

NO RESPONSE RECEIVED.

*** IE : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** IE : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 03/31/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: B. HATTER

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

N/A - REPORTS WERE REVIEWED. NMSS PLANS TO REFERENCE PARTS OF THESE REPORTS IN A FORTHCOMING GUIDANCE PACKAGE TO LICENSEES. THE UPGRADE RULE GUIDANCE DEVELOPMENT WORKING GROUP REFERRED TO THESE DOCUMENTS IN THEIR PREPARATION OF THE FIXED SITE PHYSICAL PROTECTION UPGRADE RULE GUIDANCE COMPENDIUM.

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/31/78 ACTUAL RESP. DATE: 08/01/79 USER OFFICE REVIEWER: F. PAGANO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SEE COMMENTS/REMARKS.

*** NRR : IMPACT OF RESULTS ***

SEE COMMENTS/REMARKS.

*** NRR : COMMENTS AND REMARKS ***

THE FIVE REPORTS (NUREG-0270, 0271, 0272, 0273, 0274) FORM A THOROUGH, THOUGH NOT EXHAUSTIVE, DESCRIPTION OF PHYSICAL SECURITY HARDWARE AND PROVIDE SOME BASES FOR ITS EVALUATION. THESE DOCUMENTS PROVIDE THE BASIC FAMILIARIZATION WITH AND SOME BASELINE DATA FOR PHYSICAL SECURITY EQUIPMENT TO THE LICENSING REVIEWER. REVIEW FOR COMMENT INITIATED 08/22/78.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 03/31/78 ACTUAL RESP. DATE: 02/22/78 USER OFFICE REVIEWER: R. JONES

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM CONDUCTED BY THE MITRE CORPORATION RESULTED IN A MULTI-VOLUME REPORT ON PHYSICAL PROTECTION HARDWARE INCLUDING DESCRIPTIONS, PERFORMANCE CHARACTERISTICS AND MANUFACTURERS SPECIFICATIONS. THIS WORK HAS MATERIALLY ASSISTED IN THE PREPARATION OF SEVERAL TECHNICAL REPORTS ON SPECIFIC TYPES OF HARDWARE AND HAS PERMITTED THE CANCELLATION OF TWO PLANNED REPORTS ON ITEMS THAT WERE ADEQUATELY COVERED IN THE MITRE REPORT. THE REPORT ALSO IS TO BE REFERENCED IN THE DESIGN GUIDANCE REPORT NOW BEING PREPARED IN CONNECTION WITH THE FUEL CYCLE FACILITY SAFEGUARDS UPGRADE RULE.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-021 DATE ISSUED: 03/24/78 RIL TITLE: CRITICAL REVIEW OF SODIUM HYDROXIDE AEROSOL TOXICITY

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

CRITICAL REVIEW OF SODIUM HYDROXIDE AEROSOL TO TOXICITY

RES COMMENTS

THIS WORK CONSISTED PRIMARILY OF A REVIEW OF RELEVANT LITERATURE (WITH SOME PRELIMINARY SUPPORTIVE ANALYSIS) PERTAINING TO THE TOXICITY OF SODIUM HYDROXIDE (NAOH). ONE INSIGHT HAS BEEN THAT SODIUM IN THE HYDROXIDE FORM, FOLLOWING AN INCIDENT INVOLVING SODIUM RELEASE, MAY NOT EXIST IN SUFFICIENT AMOUNTS TO WARRANT FURTHER ATTENTION. IN ADDITION, THE CHEMICAL SPECIES THAT WOULD BE PRESENT IN APPRECIABLE QUANTITIES (NA2CO3) MAY NOT BE OF CONCERN IN TERMS OF HEALTH EFFECTS.
THE PRINCIPAL FINDINGS WHICH SUBSTANTIATE THE ABOVE INSIGHTS ARE:
(A) FOR RELATIVE HUMIDITIES EXCEEDING 35%, IT APPEARS THAT NAOH DROPLETS IN THE ATMOSPHERE WILL BE TRANSFORMED TO SODIUM CARBONATE DECAHYDRATE IN LESS THAN A MINUTE IF THE NAOH AEROSOL CONCENTRATION IS LESS THAN OR EQUAL TO ABOUT 100 MG/M3. THIS TRANSFORMATION WILL TAKE LONGER IF THE RELATIVE HUMIDITY IS LESS THAN 35%.
(B) THE ALKALINITY OF A SODIUM CARBONATE SOLUTION WILL BE SUBSTANTIALLY LESS THAN THAT OF A SODIUM HYDROXIDE SOLUTION OF THE SAME NORMALITY; THUS, CARBONATE AEROSOLS WILL BE LESS HAZARDOUS, PER SODIUM ATOM, THAN HYDROXIDE AEROSOLS.
(C) THE TRANSFORMATION FROM THE SODIUM HYDROXIDE TO SODIUM CARBONATE DECAHYDRATE INCREASES THE AERODYNAMIC DIAMETER OF THE AEROSOL BY APPROXIMATELY 40%. THIS INCREASE IN DIAMETER SHIFTS SOME OF THE AEROSOL OUT OF THE RESPIRABLE RANGE AND THUS LOWERS THE RESPIRABLE FRACTION OF THE AEROSOL. HYDROXIDE OR CARBONATE PARTICLES ENTERING THE UPPER RESPIRATORY TRACT WILL ABSORB WATER AND GROW SO THE RESPIRABLE FRACTION WILL DECREASE.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/29/78 ACTUAL RESP. DATE: 11/09/79 USER OFFICE REVIEWER: J. LONG/T. SPEIS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

1. THE REPORT PROVIDES THE LATEST AVAILABLE INFORMATION ON SODIUM HYDROXIDE AEROSOL BEHAVIOR AND ITS TOXICOLOGY. THIS INFORMATION IS NEEDED IN OUR REVIEW ON CONTROL ROOM HABITABILITY AND OFF-SITE CONSEQUENCES FOLLOWING A POSTULATED ACCIDENTAL RELEASE OF SODIUM METAL AND SODIUM FIRE.
2. THE AUTHOR HAS SURVEYED THE TOXICITY OF FUMES THAT EMANATE FROM A LARGE FIRE OF NON-RADIOACTIVE SODIUM. HE HAS SHOWN THAT THE INITIAL PRODUCTS SODIUM OXIDES ARE ALMOST IMMEDIATELY CONVERTED TO SODIUM HYDROXIDE IN THE ATMOSPHERE, AND WITHIN A FEW MINUTES, TO THE MUCH LESS TOXIC SODIUM CARBONATE. THERE IS AN APPLICATION OF THIS WORK IN THE ANALYSIS OF SECONDARY SODIUM FIRES IN LMFBR'S.

*** NRR : IMPACT OF RESULTS ***

1. THE REPORT FORMS A BASIS FOR CONSIDERING OTHER SPECIES LESS TOXIC AND MORE READILY FORMED THAN SODIUM HYDROXIDE IN OUR REVIEW OF SODIUM HAZARDS.
2. THE RESULTS SEEM TO COMFIRM THAT THE COMMONLY USED US CEILING OF 2 MG/MS FOR NAOH IS PROBABLY ACCEPTABLE FOR ACCIDENT CALCULATIONS. THERE IS INSUFFICIENT EVIDENCE HOWEVER TO PERMIT THE INCREASE OF THIS LIMIT BASED ON THE TRANSITION TO NA2CO3, ALTHOUGH THIS TRANSITION SEEMS PROBABLE WITHIN A FEW MINUTES.

*** NRR : COMMENTS AND REMARKS ***

1. AUTHORS RECOMMENDATIONS FOR FURTHER WORK SHOULD BE CONSIDERED WITH RESPECT TO NRR'S NEEDS.
2. EXPERIMENTAL WORK ON THE KINETICS OF THE TRANSITION OF NAOH TO NA2CO3 WOULD BE REQUIRED IF IT IS DESIRED TO TAKE ADVANTAGE OF THIS TRANSITION IN ASSESSING THE HAZARDS FROM THE FUMES OF A SODIUM FIRE. ADDITIONAL STUDIES OF THE TOXICITY OF NAOH AT EARLY STAGES AND DURING THE TRANSITION MIGHT ALSO BE REQUIRED. FOR EXAMPLE, EFFECTS OF PARTICLE SIZE AS WELL AS FUME DENSITY MAY BE IMPORTANT.

RIL NO: 78-023 **DATE ISSUED**: 04/10/78 **RIL TITLE**: "EASI" ADVERSARY SEQ. EVAL. MODEL (COMP. GRAPH. VERSION)

RESEARCH REVIEW GROUP NO.: 4-01 0-00 **SPONSORING OFFICE(S)**: NMSS

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

"EASI" ADVERSARY SEQUENCE EVALUATION MODEL (COMPUTER GRAPHICS VERSION)

RES COMMENTS

RESEARCH HAS BEEN COMPLETED ON DEVELOPING A GRAPHICS DISPLAY VERSION OF A COMPUTER MODEL CALLED ESTIMATE OF ADVERSARY SEQUENCE INTERRUPTION (EASI), AND RESPONDS TO AN EXPRESSED NEED FOR EVALUATIVE METHODS FOR FIXED-SITE THEFT AND SABOTAGE PREVENTION SYSTEMS. DOCUMENTATION HAS ALREADY BEEN MADE AVAILABLE THROUGHOUT NRC CONCERNING PROGRAMMABLE POCKET CALCULATOR VERSIONS OF EASI MODEL.

THE OBJECTIVE OF THE "EASI" METHOD IS TO PROVIDE A USABLE EVALUATION METHOD WHICH CAN SERVE AS EITHER A PHYSICAL PROTECTION SYSTEM DESIGN AID OR AS A DECISION AID IN THE LICENSING AND INSPECTION PROCESS. THE EASI GRAPHICS PROGRAM ALLOWS THE USER TO INPUT FACILITY AND ADVERSARY PATH ATTRIBUTES AT A COMPUTER GRAPHICS TERMINAL, AND OBTAIN AS OUTPUT A CRT "PERSPECTIVE VIEW" LINE PLOT. THE METHOD CAN TREAT BOTH THEFT AND SABOTAGE OBJECTIVES BY THREATS OF INSIDERS, OUTSIDERS, AND COMBINATIONS OF EACH GROUP. THE RESULTS OF THE EASI ANALYSIS ARE EXPRESSED IN TERMS OF THE PROBABILITY THAT THE PHYSICAL PROTECTION SYSTEM CAN RESPOND IN TIME TO INTERRUPT AN ADVERSARY ALONG A PHYSICAL PATH (ACTION SEQUENCE). TO SUPPLEMENT THE EASI CALCULATIONS, EASI GRAPHICS PROVIDES THE ANALYST WITH A SELECTION OF SIX TWO-DIMENSIONAL AND EIGHT THREE-DIMENSIONAL PLOTS. THESE PLOTS ALLOW THE USER TO EXAMINE THE SENSITIVITIES OF VARIOUS COMPONENTS ALONG THE ADVERSARY'S PATH AND TO STUDY THE EFFECT ON THE PROBABILITY OF INTERRUPTION OF VARYING THE PERFORMANCE OF THESE COMPONENTS.

IT IS RECOMMENDED THAT THE EASI METHOD BE USED BY NMSS AND OTHER OFFICES AS AN ANCILLARY AID IN DEVELOPING PERFORMANCE-ORIENTED REGULATIONS OR IN CARRYING OUT A COMPREHENSIVE EVALUATION PROGRAM.

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 06/10/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: B. HATTER/G. LEWIS

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

1. TEST APPLICATIONS ARE BEING CONDUCTED TO DETERMINE USER SUITABILITY.
2. THE RESULTS OF THESE EFFORTS HAVE BEEN USED IN THE CURRENT DEVELOPMENT OF IMPROVED EVALUATIVE METHODS FOR FIXED SITE SAFEGUARDS.

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 06/10/78 ACTUAL RESP. DATE: 08/01/79 USER OFFICE REVIEWER: F. PAGANO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SEE COMMENTS/REMARKS.

*** NRR : IMPACT OF RESULTS ***

SEE COMMENTS/REMARKS.

*** NRR : COMMENTS AND REMARKS ***

THE KEY TO THE UTILITY OF EVALUATION MODELS IS THE RATIO OF THE EFFORT REQUIRED TO RUN THE MODEL TO THE USEFULNESS OF THE RESULTS OBTAINED. ALTHOUGH SAFEGUARDS EVALUATION MODELS DEVELOPED TO DATE TEND TOWARDS INORDINATE INPUT COMPLEXITIES BY COMPARISON WITH OUTPUT UTILITY, EASI HAS BEEN A WELCOME EXCEPTION TO THIS TREND. CONSEQUENTLY, EASI HAS BEEN USEFUL AS AN AID TO LICENSING DECISION MAKING, AND HAS BEEN DISTRIBUTED BY NRR TO THE POWER REACTOR LICENSEES AS AN AID IN PHYSICAL SECURITY SYSTEM DESIGN. THE ADDITIONAL COMPUTER PROGRAMMING WHICH PERMITS THE USE OF COMPUTER GRAPHICS IN CONJUNCTION WITH THE EASI CODE MAY BE USEFUL FOR PARAMETRIC DESIGN STUDIES, ALTHOUGH IT PROVIDES LITTLE ADDITIONAL UTILITY TO THE LICENSING REVIEWER. ADDITIONS AND FURTHER VARIATIONS OF THIS SIMPLE TOOL APPEAR TO PROVIDE DIMINISHING RETURNS.

RIL NO: 78-024 **DATE ISSUED**: 04/10/78 **RIL TITLE**: "FESEM" ADVERSARY SEQUENCE EVALUATION MODEL

RESEARCH REVIEW GROUP NO.: 4-01 0-00 **SPONSORING OFFICE(S)**: NMSS

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

"FESEM" ADVERSARY SEQUENCE EVALUATION MODEL

RES COMMENTS

RESEARCH HAS BEEN COMPLETED ON THE FORCIBLE ENTRY SAFEGUARDS EFFECTIVENESS MODEL (FESEM), IN RESPONSE TO A NEED FOR EVALUATIVE METHODS FOR FIXED-SITE THEFT AND SABOTAGE PREVENTION SYSTEMS.

THE PURPOSE OF THIS STUDY WAS TO DEVELOP A METHODOLOGY FOR ANALYZING FIXED-SITE SECURITY SYSTEMS AS TO THEIR EFFECTIVENESS AGAINST A FORCIBLE ATTACK BY AN ADVERSARY INTENT ON CREATING AN ACT OF SABOTAGE OR THEFT. THE MODEL PROVIDES A FRAMEWORK FOR PERFORMING INEXPENSIVE EXPERIMENTS RELATED TO FIXED-SITE SECURITY SYSTEMS, FOR TESTING ALTERNATIVE DECISIONS, AND FOR DETERMINING THE RELATIVE COST EFFECTIVENESS ASSOCIATED WITH THESE DECISION POLICIES.

THE RESULT OF THE FESEM ANALYSIS INCLUDE ESTIMATES OF THE PROBABILITY OF SABOTAGE OR THEFT WINS (AND LOSSES) BASED ON ATTACK FORCE SIZE, ATTACK MOBILITY, AND TYPE OF ATTACK; COLLECTED STATISTICS ASSOCIATED WITH EACH VARIABLE (E.G., NUMBER OF WINS BY DEFENDERS AND BY ATTACKERS FOR SUCCESSFUL SABOTAGE OR THEFT, ALARM TYPES FOR ALL RUNS, TIME REQUIRED FOR SUCCESSFUL SABOTAGE OR COMPLETION OF THEFT, ETC.).

THE PROGRAM IS CURRENTLY AVAILABLE FOR NRC USE VIA AN ACCESS CODE NUMBER TO SANDIA'S COMPUTER. A TRAINING PROGRAM WAS GIVEN IN FEBRUARY 1978 TO INTERESTED NRC PERSONNEL AND POTENTIAL USERS.

IT IS RECOMMENDED THAT THE FESEM MODEL BE USED BY NMSS AND OTHER OFFICES AS AN ANCILLARY AID IN FORMULATING REGULATORY REQUIREMENTS, LICENSING, INSPECTION AND OTHER MONITORING OPERATIONS.

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 06/10/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: B. HATTER/G. LEWIS

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

1. TEST APPLICATIONS ARE BEING CONDUCTED TO DETERMINE USER SUITABILITY.
2. THE RESULTS OF THESE EFFORTS HAVE BEEN USED IN THE CURRENT DEVELOPMENT OF IMPROVED EVALUATIVE METHODS FOR FIXED SITE SAFEGUARDS.

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 06/10/78 ACTUAL RESP. DATE: 08/01/79 USER OFFICE REVIEWER: F. PAGANO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SEE COMMENTS/REMARKS.

*** NRR : IMPACT OF RESULTS ***

SEE COMMENTS/REMARKS.

*** NRR : COMMENTS AND REMARKS ***

THE KEY TO THE UTILITY OF EVALUATION MODELS IS THE RATIO OF THE EFFORT REQUIRED TO RUN THE MODEL TO THE USEFULNESS OF THE RESULTS. ALTHOUGH THE FESEM OUTPUT PROVIDED INFORMATION WHICH WOULD BE USEFUL IN THE DESIGN AND EVALUATION OF PHYSICAL SECURITY SYSTEMS FOR POWER REACTORS, THE UTILITY OF SUCH INFORMATION (MUCH OF WHICH IS INTUITIVELY OBVIOUS TO A PHYSICAL SECURITY EXPERT) DOES NOT APPEAR TO WARRANT THE EXTENSIVE EFFORT REQUIRED FOR INPUT PREPARATION AND EXECUTION OF THIS MODEL. IN ADDITION, THE ACCURACY OF THE COMPUTED RESULTS CANNOT BE VERIFIED AS A RESULT OF THE LIMITED APPLICABILITY OF MILITARY-TYPE ENGAGEMENT MODELS TO THE PROBLEM OF SABOTAGE OF A REACTOR FACILITY.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 06/10/78 ACTUAL RESP. DATE: 09/13/78 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE RESULTS OF THE EFFORTS WILL BE USED IN DEVELOPMENT OF STANDARDS FOR SAFEGUARDS SYSTEMS AS WELL AS BY LICENSEES IN DEVELOPING THEIR SYSTEMS AND BY NRC IN EVALUATING THOSE SYSTEMS.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-025 DATE ISSUED: 03/21/78 RIL TITLE: FRAP-S3

RESEARCH REVIEW GROUP NO.: 1-12 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

FRAP-S3

RES COMMENTS

FRAP-S3 IS A BEST-ESTIMATE COMPUTER CODE THAT CALCULATES THE THERMAL AND MECHANICAL RESPONSE CHARACTERISTICS OF A NUCLEAR FUEL ROD OPERATING UNDER STEADY-STATE POWER CONDITIONS, AND WAS DEVELOPED TO PROVIDE ACCURATE INITIAL VALUES OF FUEL-ROD PARAMETERS FOR INPUT INTO TRANSIENT ANALYSIS CODES SUCH AS FRAP-T AND RELAP. IT IS CAPABLE OF SUPPLYING THE HOT-STATE VALUES OF SUCH QUANTITIES AS:
1. STORED ENERGY
2. RADIAL TEMPERATURE DISTRIBUTIONS AT GIVEN AXIAL LOCATIONS
3. TOTAL FISSION GAS RELEASE
4. ROD INTERNAL GAS PRESSURE AND COMPOSITION
5. CLAD DEFORMATION
6. AMOUNT OF PELLET-CLAD INTERACTION (PCI)
7. FUEL DEFORMATION (SWELLING, DENSIFICATION, RELOCATION, AND THERMAL EXPANSION)
8. FUEL-CLAD GAP SIZE AND GAP CONDUCTANCE
9. CLAD-CORROSION AND HYDRIDING.

ALL OF THESE QUANTITIES ARE STRONGLY DEPENDENT UPON THE OPERATING HISTORY OF THE ROD, AND EACH WILL HAVE A LARGE EFFECT ON THE PREDICTED AND MEASURED RESPONSE OF A FUEL ROD DURING A TRANSIENT. THE CODE, THEREFORE, HAS BEEN DESIGNED TO PROVIDE THESE AND OTHER QUANTITIES FOR ANY GIVEN POWER HISTORY AS INITIAL CONDITIONS TO THE TRANSIENT CODES.

THE VERIFICATION OF THE FRAP-S3 CODE HAD TWO MAJOR OBJECTIVES: (1) TO DETERMINE THE CODE PERFORMANCE IN PREDICTING THE AVAILABLE, QUALIFIED, EXPERIMENTAL DATA, AND (2) TO IDENTIFY THOSE AREAS THAT REQUIRE MORE SOPHISTICATED MODELING OR MORE EXPERIMENTAL DATA. THE CODE PERFORMANCE AND DATA WERE ANALYZED USING STATISTICAL METHODS, THUS, ALL OF THE MAJOR RESPONSE VARIABLES ARE PRESENTED ALONG WITH THEIR CORRESPONDING STANDARD ERROR BOUNDS. THE VERIFICATION PROCEDURE USED INFORMATION FROM OVER 700 FUEL RODS CONTAINING A WIDE RANGE OF OPERATING AND DESIGN PARAMETERS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/21/78 ACTUAL RESP. DATE: 05/22/78 USER OFFICE REVIEWER: D. ROSS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

STEADY-STATE FUEL PERFORMANCE CODES ARE REVIEWED BY NRR AS PART OF LOCA AND OTHER ACCIDENT ANALYSIS. NRR USES AN INDEPENDENT NRC-DEVELOPED CODE FOR AUDIT PURPOSES IN THESE REVIEWS.

*** NRR : IMPACT OF RESULTS ***

NO DIRECT IMPACT. NRR USES THE GAPCON SERIES OF CODES IN AUDIT WORK AS IT HAS DONE SINCE BEFORE FRAP-S WAS DEVELOPED. NRR HAS NO PLANS TO USE FRAP-S IN THIS CAPACITY.

*** NRR : COMMENTS AND REMARKS ***

THE FRAP-S CODE WAS DEVELOPED BY RES TO INITIALIZE VARIOUS ANALYSIS CODES. RES AND NRR HAVE RECOGNIZED THE DUPLICATE GAPCON AND FRAP-S CODE EFFORTS AND HAVE CONSOLIDATED THESE EFFORTS INTO A HYBRID CODE FRAPCON. FRAPCON WILL CONTAIN SOME ELEMENTS FROM FRAP-S3. BUT FRAP-S DEVELOPMENT WILL BE DISCONTINUED.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 05/21/78 ACTUAL RESP. DATE: 07/19/79 USER OFFICE REVIEWER: R. RIVERBANK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE ENGINEERING METHODOLOGY STANDARDS BRANCH PLANS TO USE THE RESEARCH RESULTS IN ITS ONGOING DEGRADED CORE COOLING TASK AND IN ESTIMATING THE FISSION PRODUCT SOURCE TERM FOR ENVIRONMENTAL ENVELOPE STANDARDS ACTIVITY. RESULTS MAY ALSO BE USED IN THE ECCS RULE CHANGE EFFORT AND, IN THE LONG TERM, IN REGULATORY GUIDES RELATED TO CORE DESIGN.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-026 DATE ISSUED: 04/27/78 RIL TITLE: IMPACT OF NUC. STA. ON REC. BEHAVIOR AT COASTAL SITES

RESEARCH REVIEW GROUP NO.: 5-21 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THE IMPACT OF OFFSHORE NUCLEAR GENERATING STATIONS ON RECREATIONAL BEHAVIOR AT ADJACENT COASTAL SITES.

RES COMMENTS

THESE RESULTS ARE OFFERED TO SUPPORT NRC COST-BENEFIT ANALYSTS WITH NEW AND IMPROVED INFORMATION FOR ASSESSNG LIKELY IMPACTS OF NUCLEAR GENERATING STATIONS ON RECREATIONAL BEHAVIOR AT ADJACENT COASTAL SITES.
THE RESEARCH RESULTS INDICATE THAT: (A) PROXIMITY OF A FLOATING NUCLEAR PLANT IS LESS IMPORTANT THAN OTHER BEACH ATTRIBUTES IN DETERMINING BEACH ATTRACTIVENESS; (B) PROBABLY NO MORE THAN (AND PERHAPS LESS THAN) 5% TO 10% OF CURRENT BEACH PATRONS WOULD AVOID A BEACH AFTER FNP SITING 3 MILES DIRECTLY OFFSHORE; AND (C) IMPACT OF AN FNP WOULD DECREASE EXPONENTIALLY AS DISTANCE AWAY INCREASED.
IN SUMMARY, THE PERCENTAGE REDUCTION IN TOURISM ATTRIBUTABLE TO SITING OF NUCLEAR POWER PLANTS OFFSHORE WOULD BE SMALL, BUT NOT NECESSARILY NEGLIGIBLE, AT POINTS CLOSE BY. THE STABILITY OF THOSE IMPACTS OVER TIME, HOWEVER, DEPENDS UPON THE STABILITY OF CURRENT ATTITUDES TOWARD AND BELIEFS ABOUT NUCLEAR POWER AND ITS SAFETY.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/29/78 ACTUAL RESP. DATE: 04/27/78 USER OFFICE REVIEWER: M. ERNST

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS STUDY IS BEING INCORPORATED INTO STAFF TESTIMONY ON FNP 1-8. THE TESTIMONY IS CONCERNED WITH POTENTIAL AVOIDANCE OF BEACH RESORTS, BY TOURIST, DUE TO PERCEIVED RISK FROM FLOATING NUCLEAR PLANTS SITED IN THE VICINITY OFFSHORE. EXTRAPOLATION OF TOURIST BEHAVIOR IN THE VICINITY OF LAND BASED NUCLEAR POWER PLANTS TO OFFSHORE PLANTS IS TENUOUS. THE STUDY ALSO PROVIDED A BROADER GENERIC UNDERSTANDING OF RECREATIONAL BEHAVIOR WHICH WILL STRENGTHEN OUR CAPABILITY TO HANDLE THIS ISSUE IN EIS'S GENERALLY.

*** NRR : IMPACT OF RESULTS ***

THIS STUDY HAS RESULTED IN STRONGER, MORE OBJECTIVE STAFF TESTIMONY CONCERNING TOURIST AVOIDANCE OF BEACHES IN THE VICINITY OF FNP'S. THE ESTIMATES OF POTENTIAL AVOIDANCE HAS ALLOWED CALCULATION OF LIKELY ECONOMIC IMPACT TO A RANGE OF COASTAL ECONOMIES. SATISFACTORY DISPOSITION OF THIS CONTENTION GENERICALLY IN THE FNP HEARINGS SHOULD REDUCE OR ELIMINATE THIS CONCERN IN FUTURE LICENSING ACTIONS FOR SPECIFIC FNP APPLICATIONS.

*** NRR : COMMENTS AND REMARKS ***

THIS STUDY WAS AN APPLICATION TO NUCLEAR SITUATIONS OF SOCIAL RESEARCH TOOLS DEVELOPED TO ANALYZE HUMAN BEHAVIOR RELATIVE TO RISK FROM NATURAL HAZARDS.

RIL NO: 78-027 **DATE ISSUED**: 06/02/78 **RIL TITLE**: "BEACON/MOD 2"

RESEARCH REVIEW GROUP NO.: 1-15 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

"BEACON/MOD 2"

RES COMMENTS

THIS RIL TRANSMITS THE BEACON/MOD 2 COMPUTER CODE MANUAL, DESCRIBES ITS FIELD OF APPLICATION AND DISCUSSES THE CODE'S STRENGTHS AND LIMITATIONS. BEACON/MOD 2 IS AN ADVANCED, BEST ESTIMATE CODE INTENDED FOR EVALUATION OF SHORT-TERM THERMOHYDRAULIC CONDITIONS WITHIN "DRY" (FULL PRESSURE) MULTICOMPARTMENT CONTAINMENTS, OR WITHIN CERTAIN REGIONS OF THE "PRESSURE SUPPRESSION" DRYWELL. THIS RESEARCH WAS INITIATED TO PROVIDE IMPORTANT MODELING IMPROVEMENTS FOR BEST ESTIMATE ANALYSIS OF THESE CONTAINMENT SYSTEMS. BEACON/MOD 2 OFFERS CONSIDERABLE ADVANTAGES OVER THE EXISTING CONTAINMENT CODES FOR BEST ESTIMATE EVALUATION OF HYDRAULIC LOADS IN MULTICOMPARTMENT PWR TYPE CONTAINMENTS. IT IS PARTICULARLY SUITABLE FOR EVALUATION OF THE REACTOR CAVITY LOADS (FOR POSTULATED BREAKS BETWEEN THE REACTOR VESSEL AND THE BIOLOGICAL SHIELD) IN BOTH PWR AND BWR CONTAINMENTS. THE CODE HAS ALSO SHOWN A CAPABILITY TO DESCRIBE THE EVOLUTION OF A TWO-PHASE (FLASHING) JET AND THE RESULTING PRESSURE LOADS ON THE IMPACTED BARRIER. IT IS RECOGNIZED THAT THE CODE MUST BE MORE EXTENSIVELY TESTED AGAINST EXPERIMENTAL DATA. NEVERTHELESS, THE BEACON/MOD 2 IS RECOMMENDED FOR CALCULATIONS OF THE REACTOR CAVITY LOADS, FOR BOTH PWR AND BWR INSTALLATIONS, AND FOR EVALUATION OF JET IMPACT LOADS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 06/10/78 ACTUAL RESP. DATE: 09/07/78 USER OFFICE REVIEWER: R. TEDESCO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE BEACON CODE, AS PRESENTLY DEVELOPED, REPRESENTS A POTENTIAL TEST ESTIMATE COMPUTER PROGRAM FOR THE CALCULATION BY NRR OF SUBCOMPARTMENT PRESSURE/TEMPERATURE RESPONSES. OF PARTICULAR IMPORTANCE TO OUR LICENSING PROCESS IS THE ABILITY OF THIS CODE TO EVALUATE THE REACTOR CAVITY PRESSURE TRANSIENT IN TWO-DIMENSIONS AS OPPOSED TO THE ONE-DIMENSIONAL COMPUTER PROGRAMS CURRENTLY IN USE IN THE LICENSING PROCESS. UPON COMPLETION OF THE PLANNED CODE VERIFICATION EFFORTS, BEACON WILL BE USED TO BENCHMARK ALL LICENSING COMPUTER PROGRAMS TO ESTABLISH A MEASURE OF THE MARGINS, WHICH CURRENTLY EXIST IN THESE LICENSING CODES.

*** NRR : IMPACT OF RESULTS ***

THE BEACON COMPUTER PROGRAM REPRESENTS A NEXT GENERATION COMPUTER PROGRAM FOR THE CALCULATION OF SUBCOMPARTMENT PRESSURE/TEMPERATURE TRANSIENT RESPONSES. FOR THE PRESENT, HOWEVER, AND PENDING SUCCESSFUL COMPLETION OF THE VERIFICATION EFFORTS, NRR DOES NOT PLAN TO USE THIS CODE IN THE LICENSING PROCESS. WHEN THE CODE HAS BEEN EVALUATED AGAINST EXPERIMENTAL DATA AND COMPLETELY CHECKED OUT, IT WILL BE MADE A PART OF THE LICENSING PROCESS. THE CODE WILL THEN BE USED AS A BEST ESTIMATE TOOL TO DETERMINE THE SAFETY MARGINS WHICH EXIST IN OUR CURRENT LICENSING REQUIREMENTS WILL DEPEND ON THE RESULTS OF THESE COMPARISONS.

*** NRR : COMMENTS AND REMARKS ***

THE BEACON CODE HAS AN EXCELLENT POTENTIAL FOR BECOMING AN IMPORTANT LICENSING TOOL. AS A RESULT, IT IS RECOMMENDED THAT THE CODE VERIFICATION EFFORT BE PERFORMED IN A TIMELY MANNER. THIS VERIFICATION EFFORT SHOULD TAKE PRIORITY OVER ANY ADDITIONAL MODIFICATIONS TO THE CODE WHICH ARE AIMED AT EXPANDING ITS BASIC ANALYTICAL CAPABILITY.

RIL NO: 78-028 DATE ISSUED: 05/09/78 RIL TITLE: "MELT/CONTRETE INTERACTIONS"

RESEARCH REVIEW GROUP NO.: 1-13 0-00

SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

"MELT/CONCRETE INTERACTIONS"

RES COMMENTS

THIS RIL DESCRIBES THE INTER-1 CODE FOR CALCULATING EFFECTS OF INTERACTION BETWEEN MOLTEN MATERIALS & CONCRETE & EXPERIMENTAL DATA FROM WHICH IT WAS DEVELOPED. THIS WORK HAS RESULTED IN AN IMPROVED MODEL BASED ON EXPERIMENTS WITH PROTOTYPICAL MATERIALS.
IN SEPARATE EFFECTS EXPERIMENTS, MONOLITHIC SPECIMENS OF CONCRETE WERE SUBJECTED TO CONTROLLED THERMAL FLUXES IN ORDER TO MEASURE RATES OF EROSION. EROSION IS LINEAR WITH TIME FOR A GIVEN HEAT FLUX, AFTER CORRECTION FOR THERMAL LOSSES THROUGHOUT REFLECTION & RADIATION. THE DOMINANT MODE OF EROSION IS QUIESCENT MELTING OF THE CEMENT (I.E., THE BINDING MATERIAL), WITH NO DIFFERENCES OBSERVED BY VARYING COMPOSITION OF AGGREGATE MATERIAL. THESE DATA ARE NECESSARY TO INTERPRET EROSION RATES OBSERVED IN INTEGRAL EXPERIMENTS. AS A RESULT OF THE INTEGRAL EXPERIMENTS, IN WHICH PROTOTYPICAL MOLTEN MATERIALS CONTACT CONCRETE, THE FOLLOWING CONCLUSIONS WERE DRAWN:

- EROSION OF CONCRETE IS THERMALLY DOMINATED, WITH INSIGNIFICANT CONTRIBUTIONS FROM MECHANICAL AND CHEMICAL EFFECTS.
- THE PRINCIPAL MECHANISM OF EROSION IS MELTING OF OF THE BINDING MATERIAL, WITH NO SIGNIFICANT QUALITATIVE DIFFERENCES CAUSED BY CHANGING THE COMPOSITION OF THE AGGREGATE.
- THE COMPOSITION OF THE CONCRETE DETERMINES THE COMPOSITION AND MASSES OF GASES RELEASED AT THE INTERFACE OF THE MELT & CONCRETE.
- TURBULENCE AND ESSENTIALLY ISOTHERMAL CONDITIONS ARE INDUCED IN THE MELT BY THE PASSAGE OF DECOMPOSITION GASES.
- HYDROGEN & CARBON MONOXIDE ARE AMONG THE GASES EVOLVED FROM SURFACE OF THE MELT & THEY BURN UPON CONTACTING AIR. THIS INDICATES THE H_2O AND CO_2 RELEASED FROM DECOMPOSING CONCRETE ARE REDUCED CHEMICALLY, MOST LIKELY BY OXIDIZING METALLIC CONSTITUENTS OF MELT.

THE EXPERIMENTS HAVE CULMINATED IN AN ANALYTICAL MODEL (INTER-1) OF THE MELT/CONCRETE INTERACTION WHICH CAN HELP EXTENT THEIR RANGE OF APPLICABILITY.
WHILE DIRECT EXTRAPOLATION OF THE DATA TO PROTOTYPICAL CONDITIONS MUST ALWAYS BE MADE CAUTIOUSLY, ENOUGH CONFIDENCE HAS BEEN DEVELOPED SO THAT NO FUNDAMENTAL DIFFERENCES IN BEHAVIOR ARE ANTICIPATED IN SCALING TO FULL-SIZE SYSTEMS RESERVATIONS EXIST REGARDING THE APPLICATION OF INTER-1 TO PREDICT SUCH VARIABLES AS THE TIME OF CONTAINMENT MELTTHROUGH OR OVERPRESSURIZATION. THE MODEL CAN BEST BE UTILIZED IN ITS CURRENT FORM TO ESTIMATE THE RELATIVE SIGNIFICANCE OF VARIATIONS IN PARAMETERS SUCH AS MATERIALS, PROPERTIES AND COMPOSITIONS, INTERFACE HEAT TRANSFER COEFFICIENTS, GEOMETRY, ETC.
THE PRIMARY SIGNIFICANCE OF THE WORK DESCRIBED IS IMPROVED UNDERSTANDING OF PHYSICAL PHENOMENA. RES RECOGNIZES THAT THE RESULTS IS UNLIKELY TO HAVE SIGNIFICANT NEAR-TERM IMPACT ON CURRENT LICENSING PROCEDURES. IT SHOULD, HOWEVER, PROVIDE ADDITIONAL BACKGROUND INFORMATION USEFUL IN ANALYZING REGULATORY ISSUES INVOLVING ACCIDENTS BEYOND DESIGN BASIS EVENTS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/30/78 ACTUAL RESP. DATE: 11/27/78 USER OFFICE REVIEWER: W. GAMMILL

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

CALCULATING THE EFFECTS OF INTERACTIONS BETWEEN MOLTEN MATERIALS AND CONCRETE IS DIRECTLY APPLICABLE TO MAKING LICENSING DECISIONS RELATED TO CONTAINMENT REQUIREMENTS FOR ADVANCED REACTORS (SUCH AS LMFBR'S) TO ENSURE COMPARABILITY WITH PRESENT DAY LWR NUCLEAR POWER PLANTS. THIS RESEARCH PROGRAM HAS IMPROVED OUR ABILITY TO PREDICT THE TIME AND MODE OF CONTAINMENT FAILURE BECAUSE OF IMPROVED UNDERSTANDING OF THE INTERACTIONS BETWEEN MOLTEN CORE MATERIALS AND CONCRETE, SUCH AS THE RATE AND EXTENT OF CONCRETE EROSION, QUANTITY AND TYPE OF GASES RELEASED, FISSION PRODUCTS RELEASE, AND THE EFFECTS OF CONCRETE CHEMICAL COMPOSITION. AS DEMONSTRATED IN NUREG-0440, "LIQUID PATHWAY GENERIC STUDY," DATED FEBRUARY 1978, THE RESULTS OF THIS RESEARCH PROGRAM ARE ALSO DIRECTLY APPLICABLE TO EVALUATING QUESTIONS OF COMPARABILITY OF CONSEQUENCES OF POSTULATED CORE MELTDOWN EVENTS AT LAND-BASED AND FLOATING NUCLEAR PLANTS.

*** NRR : IMPACT OF RESULTS ***

THE IMPACT OF RESULTS OF THIS RESEARCH PROGRAM ON CURRENT LICENSING PROCEDURES REMAINS TO BE EVALUATED. THESE RESEARCH RESULTS HAVE PLAYED AN IMPORTANT ROLE IN NRR'S SAFETY EVALUATION OF THE CLINCH RIVER BREEDER REACTOR (CRBR) AND THE FAST FLUX TEST FACILITY (FFTF), PARTICULARLY IN REGARD TO EVALUATING THE CONSEQUENCES OF POSTULATED CORE MELTDOWN EVENTS AND ESTABLISHING APPROPRIATE CONTAINMENT REQUIREMENTS TO ENSURE COMPARABILITY WITH PRESENT DAY LWR PLANTS.
THESE RESEARCH RESULTS HAVE ALSO HAD AN IMPORTANT IMPACT ON THE STAFF'S CONCLUSIONS CONTAINED IN THE "LIQUID PATHWAY GENERIC STUDY," NUREG-0127, DATED FEBRUARY 1978. THE STUDY FOUND THAT THE RISKS ASSOCIATED WITH RELEASES TO THE HYDROSPHERE AT A FLOATING NUCLEAR PLANT (FNP) ARE GREATER THAN THOSE AT A LAND BASED PLANT (LBP) FOR CORE MELT ACCIDENTS. THE STAFF THEN ASKED THE APPLICANT TO MAKE DESIGN CHANGES IN THE PLANT TO MITIGATE THE CONSEQUENCES OF THIS KIND OF ACCIDENT; SPECIFICALLY, THE STAFF IN THE DRAFT ENVIRONMENTAL STATEMENT, PART III (NUREG-0127), MAY 1978, AND IN A SUBSEQUENT LETTER TO OFFSHORE POWER SYSTEMS (OPS) (R.P. BALLARD TO A.P. ZECHELLA, JULY 25. 1978) REQUESTED THAT THE CONCRETE PAD BENEATH THE REACTOR VESSEL BE REPLACED BY SOME MATERIAL THAT PROVIDES INCREASED RESISTANCE TO A MELT THROUGH BY THE REACTOR CORE. FINALLY, THE RESULTS OF THIS RESEARCH PROGRAM ARE IMPROVING OUR ABILITY TO MAKE QUANTITATIVE RISK ASSESSMENTS ON EXISTING AND PROPOSED NEW TYPES OF REACTORS WHICH WILL ASSIST NRR IN MAKING LICENSING DECISIONS IN REGARD TO DESIGN AND SITING.

*** NRR : COMMENTS AND REMARKS ***

THE ADVANCED REACTORS BRANCH (NRR) TRANSMITTED COMMENTS ON RIL #28 TO THE FUEL BEHAVIOR RESEARCH BRANCH (RES) IN A MEMORANDUM FROM T. P. SPEIS TO W. V. JOHNSTON, DATED OCTOBER 13, 1978. RESOLUTION OF THESE COMMENTS IS NOW IN PROCESS. IN ADDITION, NRR PLANS TO WRITE A RESEARCH REQUEST TO RES TO EXPAND THIS PROGRAM TO EXAMINE MELT INTERACTIONS WITH SACRIFICIAL MATERIALS IN CONNECTION WITH THE LICENSING REVIEW OF OPS'S APPLICATION TO MANUFACTURE 8 FLOATING NUCLEAR PLANTS.
ALTHOUGH THIS RESEARCH PROGRAM HAS GREATLY IMPROVED OUR UNDERSTANDING OF THE PHYSICAL PHENOMENA ASSOCIATED WITH MELT/CONCRETE INTERACTIONS, THIS WORK SHOULD CONTINUE WITH THE OBJECTIVE OF EXPERIMENTAL VERIFICATION OF THE CORE MELT/CONCRETE INTERACTION COMPUTER MODEL (INTER), SUCH THAT EXTRAPOLATION TO PROTOTYPICAL CONDITIONS CAN BE MADE TO ACCURATELY PREDICT SUCH VARIABLES AS THE TIME OF CONTAINMENT MELT-THROUGH OR OVERPRESSURIZATION. NRR HAS BEEN IN CLOSE CONTACT WITH THE RES STAFF ON RESEARCH RELATED TO MATERIALS INTERACTIONS BETWEEN CORE MELT DEBRIS AND CONCRETE AND MAINTAINS COGNIZANCE OF SUCH WORK IN THE U.S. AND OTHER COUNTRIES.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 08/30/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

NO RESPONSE RECEIVED.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-029 **DATE ISSUED**: 06/07/78 **RIL TITLE**: "FUEL ROD ANALYSIS COMPUTER CODE: FRAP-T3"

RESEARCH REVIEW GROUP NO.: 1-12 0-00 **SPONSORING OFFICE(S)**: RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

"FUEL ROD ANALYSIS COMPUTER CODE: FRAP-T3"

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH TO PREPARE AND TEST THE THIRD MODIFICATION OF THE COMPUTER CODE FRAP-T (FUEL ROD ANALYSIS PROGRAM - TRANSIENT). FRAP-T IS A FORTRAN IV COMPUTER CODE BEING DEVELOPED TO PREDICT THE TRANSIENT RESPONSE OF A LWR FUEL ROD DURING POSTULATED ACCIDENTS SUCH AS (LOSS-OF-COOLANT ACCIDENTS, POWER COOLING MISMATCH ACCIDENTS, REACTIVITY INITIATED ACCIDENTS, OR INLET FLOW BLOCKAGE ACCIDENTS. FRAP-T IS ALSO BEING DEVELOPED TO PERFORM THE CALCULATIONS NEEDED FOR PLANNING AND ANALYZING POWER BURST FACILITY AND LOSS OF FLUID TEST EXPERIMENTS.
IN FRAP-T3, THE COUPLED EFFECTS OF MECHANICAL, THERMAL, INTERNAL GAS AND MATERIAL PROPERTY RESPONSE ON THE BEHAVIOR OF THE FUEL ROD ARE CONSIDERED. GIVEN APPROPRIATE COOLANT CONDITION AND POWER HISTORIES, FRAP-T3 CAN CALCULATE ROD BEHAVIOR FOR A WIDE VARIETY OF OFF-NORMAL SITUATIONS AND POSTULATED ACCIDENT CONDITIONS (E.G., BWR OR PWR POWER TRANSIENTS, FLOW COASTDOWN, LOAD LOSS OR COOLANT DEPRESSURIZATION).
IN THE CONTEXT OF LWR SYSTEM TRANSIENTS FRAP IS WELL SUITED TO BE USED AS A COMPONENT CODE TO DESCRIBE FINE DETAILS OF FUEL ROD BEHAVIOR. FURTHERMORE, SENSITIVITY STUDIES WITH FRAP WILL FACILITATE DEFINITION OF THE SIMPLEST ACCEPTABLE FUEL DESCRIPTION IN SYSTEMS CODES.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/30/78 ACTUAL RESP. DATE: 07/31/78 USER OFFICE REVIEWER: J. VOGLEWEDE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

TRANSIENT FUEL PERFORMANCE CODES ARE REVIEWED BY NRR AS PART OF LOCA AND OTHER ACCIDENT ANALYSES. NRR USES INDEPENDENT NRC-DEVELOPED CODES FOR AUDIT PURPOSES IN THESE REVIEWS.

*** NRR : IMPACT OF RESULTS ***

FRAP-T3 IS ONE VERSION OF THE FRAP TRANSIENT FUEL PERFORMANCE CODE. BECAUSE THIS IS ONLY AN INTERIM VERSION OF A BEST-ESTIMATE CODE, IT HAS NOT BEEN ADAPTED FOR LICENSING APPLICATIONS. IN THE FUTURE, NRR PLANS TO USE THE WATER REACTOR ANALYSIS PACKAGE (WRAP) WHICH WILL INCLUDE A MORE CURRENT VERSION OF FRAP-T THAT INCORPORATED CONSERVATIVE MODIFICATIONS. IN PRESENT AUDIT WORK, NRR USES THE WATER REACTOR EVALUATION MODEL (WREM) SERIES OF CODES WHICH DOES NOT INCLUDE FRAP-T3.

*** NRR : COMMENTS AND REMARKS ***

THE NEED FOR A MORE DETAILED TRANSIENT FUEL BEHAVIOR CODE IN LICENSING APPLICATIONS HAS LONG BEEN RECOGNIZED BY NRR. IT IS EXPECTED THAT A MORE CURRENT VERSION OF THE FRAP-T CODE SERIES WILL BE ADAPTED FOR LICENSING APPLICATIONS. ALTHOUGH CONSERVATIVE MODIFICATIONS WILL BE REQUIRED, THIS CODE WILL CONTAIN MANY OF THE ELEMENTS NOW IN FRAP-T3.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 08/30/78 ACTUAL RESP. DATE: 07/31/78 USER OFFICE REVIEWER: G. RIVENBARK

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

TRANSIENT FUEL PERFORMANCE CODES ARE REVIEWED BY NRR AS PART OF LOCA AND OTHER ACCIDENT ANALYSES. NRR USES INDEPENDENT NRC-DEVELOPED CODES FOR AUDIT PURPOSES IN THESE REVIEWS.

*** SD : IMPACT OF RESULTS ***

FRAP-T3 IS ONE VERSION OF THE FRAP TRANSIENT FUEL PERFORMANCE CODE. BECAUSE THIS IS ONLY AN INTERIM VERSION OF A BEST-ESTIMATE CODE, IT HAS BEEN ADAPTED FOR LICENSING APPLICATIONS. IN THE FUTURE, NRR PLANS TO USE THE WATER REACTOR ANALYSIS PACKAGE (WRAP) WHICH WILL INCLUDE A MORE CURRENT VERSION OF FRAP-T THAT INCORPORATES CONSERVATIVE MODIFICATIONS. IN PRESENT AUDIT WORK, NRR USES THE WATER REACTOR EVALUATION MODEL (WREM) SERIES OF CODES WHICH DOES NOT INCLUDE FRAP-T3.

*** SD : COMMENTS AND REMARKS ***

THE NEED FOR A MORE DETAILED TRANSIENT FUEL BEHAVIOR CODE IN LICENSING APPLICATIONS HAS LONG BEEN RECOGNIZED BY NRR. IT IS EXPECTED THAT A MORE CURRENT VERSION OF THE FRAP-T CODE SERIES WILL BE ADAPTED FOR LICENSING APPLICATIONS. ALTHOUGH CONSERVATIVE MODIFICATIONS WILL BE REQUIRED, THIS CODE WILL CONTAIN MANY OF THE ELEMENTS NOW IN FRAP-T3.

RIL NO: 78-030 **DATE ISSUED**: 06/28/78 **RIL TITLE**: PHASE I FINAL REPORT, "BARRIER PENETRATION DATA BASE"

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

PHASE I FINAL REPORT, "BARRIER PENETRATION DATA BASE"; OF STUDY, "ASSISTANCE-PHYSICAL PROTECTION ASSESSMENTS"

RES COMMENTS

THE REPORTED RESULTS PROVIDED:

1. A CLASSIFICATION OF BARRIERS IN TERMS OF THE PENETRATION TIME FOR SELECTED COUNTERMEASURES WHICH AN ADVERSARY MIGHT USE TO OVERCOME THE BARRIER, AND
2. PROCEDURES TO BE FOLLOWED IN TESTING REACTOR SITES FOR COMPLIANCE FOR 10 CFR 73.55, THE REACTOR SAFEGUARDS REGULATION.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/28/78 ACTUAL RESP. DATE: 08/30/78 USER OFFICE REVIEWER: J. MILLER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

AS STATED IN THE RIL, THE BARRIER PENETRATION DATA BASE IS AVAILABLE AS A SUPPLEMENTAL DATA SOURCE FOR USE IN THE EVALUATION OF LICENSEE FACILITY SAFEGUARD PROGRAMS. THE DATA PROVIDES A STANDARDIZED BASE OF BARRIER DELAY TIMES AGAINST VARIOUS ADVERSARY COUNTERMEASURES FROM CURRENTLY AVAILABLE LITERATURE. THIS DATA WILL PROVIDE FOR MORE RELIABLE AND CONSISTENT EVALUATION OF SAFEGUARD PROGRAMS BY BOTH THE NRR STAFF AND LICENSEE STAFFS.

*** NRR : IMPACT OF RESULTS ***

THIS COMPILATION OF DATA IS USEFUL FOR THE DESIGN OF PHYSICAL SECURITY SYSTEMS BY THE LICENSEES, AS WELL AS IN THE EVALUATION OF THE EFFECTIVENESS OF SUCH SYSTEMS BY NRR. ALTHOUGH THE RESULTS OF THIS PROGRAM WERE NOT AVAILABLE DURING THE DESIGN PHASE OF THE CURRENT UPGRADING OF PHYSICAL SECURITY AT NUCLEAR POWER PLANTS, THIS DATA BASE WILL PROVIDE USEFUL DATA FOR FUTURE APPLICATIONS.

*** NRR : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-031 **DATE ISSUED**: 07/10/78 **RIL TITLE**: "ASSAY OF STD REFERENCE MAT'L (SRM) 950B"

RESEARCH REVIEW GROUP NO.: 4-05 0-00 **SPONSORING OFFICE(S)**: SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

ASSAY OF STANDARD REFERENCE MATERIAL (SRM) 950

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF A COMPLETED PHASE OF RESEARCH ON THE ASSAY DETERMINATION OF URANIUM IN STANDARD REFERENCE MATERIAL (SRM) 950B, IN RESPONSE TO A NEED TO IMPROVE THE QUALITY OF MEASUREMENTS MADE ON SPECIAL NUCLEAR MATERIAL FOR CONTROL AND ACCOUNTING PURPOSES. THE PURPOSE OF THE WORK WAS TO DEVELOP AND CERTIFY A URANIUM OXIDE (U308) ASSAY STANDARD TO REPLACE THE VIRTUALLY DEPLETED SRM 950A, USED IN NONDESTRUCTIVE ASSAYS.
THE RESEARCH RESULTS INDICATE THAT THE NEWLY DEVELOPED SRM 950B CALIBRATION STANDARD HAS A CERTIFIED VALUE OF 99.97 +/- 0.02 PERCENT URANIUM OXIDE (U308).
THESE RESULTS ARE EXPECTED TO IMPROVE THE STANDARDIZATION AND CALIBRATION CAPABILITY OF BOTH NRC FIELD INSPECTORS AND THE NUCLEAR INDUSTRY AS A WHOLE; THEY ARE EXPECTED TO HAVE A SIGNIFICANT NEAR-TERM IMPACT ON CURRENT SD GUIDES THAT WILL ADDRESS THE IMPLEMENTATION OF 10 CFR 70.57, LICENSEES MEASUREMENT CONTROL PLANS.

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 08/30/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: B. HATTER

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

TEST APPLICATIONS ARE BEING CONDUCTED TO DETERMINE USER SUITABILITY.

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

BEST DOCUMENT AVAILABLE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/30/78 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: W. GAMMILL

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

NO RESPONSE RECEIVED.

*** NRR : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NRR : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-032 DATE ISSUED: 08/03/78 RIL TITLE: IMPROVEMENTS IN AEROSOL BEHAVIOR CODE (LMFBR'S).

RESEARCH REVIEW GROUP NO.: 2-07 0-00 SPONSORING OFFICE(S): RES

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

IMPROVEMENTS IN THE AEROSOL BEHAVIOR CODE FOR RADIOLOGICAL ASSESSMENTS OF LMFBR'S

RES COMMENTS

THIS MEMORANDUM TRANSMITS THE RESULTS OF COMPLETED RESEARCH ON THE MEASUREMENT OF SODIUM OXIDE AEROSOL PROPERTIES. SODIUM OXIDE IS THE KEY AEROSOL CONSTITUENT IN POSTULATED SEVERE LMFBR ACCIDENTS.
FOR THE MOST SEVERE POSTULATED LMFBR ACCIDENT SCENARIOS (HCDA AND CORE MELT), SODIUM-OXIDE AEROSOL REPRESENTS THE HIGHEST AIRBORNE MASS CONCENTRATIONS IN THE CONTAINMENT VESSEL AND IS EXPECTED TO DOMINATE AND GOVERN THE BEHAVIOR OF THE FUEL AND FISSION PRODUCT AEROSOL. THEREFORE, AS A FIRST STEP IN IMPROVING THE AEROSOL BEHAVIOR CODE, HAARM-2, SEPARATE EFFECTS WORK WAS CARRIED OUT ON SODIUM-OXIDE AEROSOL.
THE RESULTS OF THESE SEPARATE EFFECTS MEASUREMENTS HAVE BEEN INCORPORATED INTO THE MODELS OF THE AEROSOL BEHAVIOR CODE HAARM-2, AND TOGETHER WITH SOME ADDITIONAL IMPROVEMENTS USED TO GENERATE A NEW VERSION CALLED HAARM-3. THE IMPROVED MODELS IN HAARM-3 PROVIDE A MORE REALISTIC DESCRIPTION OF PARTICLE CHARACTERISTICS AND THEREBY ALLOW IMPROVED ESTIMATES OF SODIUM-OXIDE AEROSOL BEHAVIOR DURING A POSTULATED HCDA. THE HAARM CODE IS USED BY NRR FOR LMFBR SITE RADIOLOGICAL CONSEQUENCE ASSESSMENT.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/15/78 ACTUAL RESP. DATE: 06/13/79 USER OFFICE REVIEWER: J. K. LONG/T. SPEIS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

CODE DESCRIBED IN THIS RIL, HAARM-3, IS USED BY NRR IN CALCULATING THE EFFECTS OF FAST REACTOR ACCIDENTS. IT IS BASED ON A PREVIOUS CODE HAARM-2, NOW MODIFIED TO REFLECT THE RESULTS OF MILLIKAN CELL EXPERIMENTS AT BCL. THE GENERAL EFFECT OF THE MODIFICATIONS IS CONFIRMED IN LARGE SCALE TESTS AT HEDL.

*** NRR : IMPACT OF RESULTS ***

CONFIRMATION OF THE NEW CODE PERMITS A REDUCTION BY AS MUCH AS A FACTOR OF 2-8 IN THE AMOUNT OF RADIOACTIVE AEROSOLS LEAKED FROM AN LMFBR CONTAINMENT IN THE EVENT OF A LARGE ACCIDENT. (RADIOACTIVE GASES ARE NOT CONSIDERED TO BE AFFECTED.)

*** NRR : COMMENTS AND REMARKS ***

THE ATTENUATION OF RADIOACTIVE AIRBORNE MATERIALS BY AGGLOMERATION AND FALLOUT IS AN IMPORTANT FACTOR IN THE CALCULATION OF ACCIDENT CONSEQUENCES. EVALUATION AND VERIFICATION OF THIS NATURAL MECHANISM FOR REDUCING RADIOACTIVE EMISSIONS HAS SIGNIFICANCE COMPARABLE TO AN ENGINEERED SAFETY FEATURE.

RIL NO: 78-033 DATE ISSUED: 08/03/78 RIL TITLE: PLUTONIUM ACCIDENT CONTAINER PROG/RESEARCH, DESIGN & DEVELOP

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NMSS

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

PLUTONIUM ACCIDENT CONTAINER PROGRAM RESEARCH, DESIGN AND DEVELOPMENT.

RES COMMENTS

RESULTS ARE REPORTED ON THE DESIGN, DEVELOPMENT AND TEST OF THE PAT-1 PLUTONIUM PACKAGE THAT MEETS THE NRC QUALIFICATION CRITERIA PUBLISHED IN NUREG-0360 "QUALIFICATION CRITERIA TO CERTIFY A PACKAGE FOR AIR TRANSPORT OF PLUTONIUM."

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 09/15/78 ACTUAL RESP. DATE: 09/15/78 USER OFFICE REVIEWER: R. CHAPPELL

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

STATED WORK IS COMPLETE AND NO OTHER ACTIVITY IS EXPECTED. RESULTS WERE USED IN THE CERTIFICATION OF THE PAT-1 PLUTONIUM PACKAGE TO CONGRESS, LICENSING THE PACKAGE FOR USE, AND PROVIDING PROTOTYPES OF THE PACKAGE TO DOE AND IAEA.

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-034 **DATE ISSUED**: 08/03/78 **RIL TITLE**: NUCLEAR DECAY DATA FOR RADIONUCLIDES

RESEARCH REVIEW GROUP NO.: 5-24 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

NUCLEAR DECAY DATA FOR RADIONUCLIDES OCCURRING IN ROUTINE RELEASES FROM NUCLEAR FUEL CYCLE FACILITIES

RES COMMENTS

THIS IS A TABULATION OF NUCLEAR DECAY DATA FOR 240 RADIONUCLIDES WHICH MIGHT BE EXPECTED TO OCCUR IN ROUTINE RELEASES OF EFFLUENTS FROM NUCLEAR FUEL CYCLE FACILITIES. THIS CAN BE USED BY NRR AS A BASIS FOR ESTIMATION OF RADIATION EXPOSURE TO MAN.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/30/78 ACTUAL RESP. DATE: 10/03/78 USER OFFICE REVIEWER: R. H. VOLLMER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

DOCUMENT PRESENTS BASIC NUCLEAR DECAY DATA FOR DEVELOPMENT OF ESTIMATES OF RADIOLOGICAL DOSE. NRR HAS BEEN EMPLOYING THESE DATA AND IN FUTURE UPDATING OF THE DOSE ASSESSMENT METHODOLOGY WILL USE THIS DOCUMENT AS THE PRIMARY REFERENCE.

*** NRR : IMPACT OF RESULTS ***

THE DOCUMENT PROVIDES THE BASIC NUCLEAR DECAY DATA IN THE FORM NECESSARY FOR RADIOLOGICAL ASSESSMENTS. THE DOCUMENT PROVIDES THE STAFF WITH A REFERENCE DOCUMENT TO ENSURE STAFF'S UNIFORM USAGE OF DATA BASIC TO ITS EFFORTS.

*** NRR : COMMENTS AND REMARKS ***

A MACHINE READABLE FILE IS AVAILABLE FROM K. ECKERMAN, NRR/DSE/RAB.

RIL NO: 78-035 **DATE ISSUED**: 09/15/78 **RIL TITLE**: A COMPUTER CODE FOR CALCULATING DOES EQUIVALENT

RESEARCH REVIEW GROUP NO.: 5-24 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B0188	DOSIMETRIC MODEL APPENDIX "I"		FOULKE J

RIL SUBJECT/DESCRIPTION

SFACTOR: A COMPUTER CODE FOR CALCULATING DOSE EQUIVALENT TO A TARGET ORGAN PER MICROCURIE - DAY RESIDENCE OF A RADIONUCLIDE IN A SOURCE ORGAN

RES COMMENTS

THE SFACTOR COMPUTER CODE CALCULATES S, THE AVERAGE DOSE EQUIVALENT TO EACH OF A SPECIFIED LIST OF TARGET ORGANS PER MICROCURIE-DAY RESIDENCE OF A RADIONUCLIDE IN SPECIFIED SOURCE ORGANS. THE SFACTOR COMPUTES COMPONENTS OF THE DOSE EQUIVALENT FROM ALPHA PARTICLES, ELECTRONS, GAMMA RAYS, FISSION FRAGMENTS, AND NEUTRONS. SFACTORS CAN BE COMPUTED FOR ANY RADIONUCLIDE FOR WHICH DECAY DATA ARE AVAILABLE.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 01/15/79 ACTUAL RESP. DATE: 11/09/79 USER OFFICE REVIEWER: K. ECKERMAN

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

DOCUMENT PRESENTS COMPUTER CODE FOR ESTIMATING DOSE EQUIVALENT TO SERIOUS TARGET ORGANS PER MICROCURIE-DAY RESIDENCE OF A NUCLIDE IN A SOURCE ORGAN.

*** NRR : IMPACT OF RESULTS ***

THE SFACTOR CODE RESULTS CAN BE USED TO ESTIMATE ORGAN DOSES GIVEN THE ORGAN BURDEN OF A RADIONUCLIDE. IN ADDITION, IF THE SFACTOR RESULTS ARE EMPLOYED WITH METABOLIC INFORMATION THE DOSE PER UNIT ACTIVITY INGESTED OR INHALED CAN BE ESTIMATED.

*** NRR : COMMENTS AND REMARKS ***

A LISTING OF THE CODE (REVISED TO INCLUDE ALPHA DOSE TO ENDOSTEAL CELLS AND BONE MARROW) IS AVAILABLE FROM K. ECKERMAN, NRR/DSE/RAB

RIL NO: 78-036 **DATE ISSUED**: 09/27/78 **RIL TITLE**: EVAL OF GENERAL ATOMIC CODES: OXIDE-3, SORS, TAP, & RECA

RESEARCH REVIEW GROUP NO.: 2-12 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

EVALUATION OF GENERAL ATOMIC CODES: OXIDE-3, SORS, TAP, AND RECA.

RES COMMENTS

THIS RESEARCH EVALUATED THE APPLICABILITY AND UTILITY OF THE CODES FOR THE ARSR/GAS COOLED REACTOR SAFETY PROGRAM. THE OBJECTIVES OF THE EVALUATIONS ALSO INCLUDED AN ASSESSMENT OF THE MODELS AND NUMERICS USED IN THE CODES AND TO NOTE UNDER WHAT CONDITIONS OR FOR WHAT SCENARIOS THE CODES WERE USEFUL. THE APPLICABILITY AND UTILITY OF THE GAC CODES FOR RSR-HTGR SAFETY PROGRAMS WAS FOUND TO BE VERY LIMITED. THE OXIDE-3 CODE APPEARS TO HANDLE OXIDATION OF GRAPHITE BY MOISTURE APPROPRIATELY UNDER NORMAL OPERATING CONDITIONS. THE CODE WILL REQUIRE FURTHER EXPERIMENTAL VERIFICATION BEFORE THE LIMITS OF ACCURACY CAN BE ESTABLISHED. THE SORS CODE IS THE FORM PRESENTED FOR OUR EVALUATION APPEARS TO HAVE SOME SERIOUS DEFICIENCIES IN THE MODELS WHICH PLACES DOUBTS ON THE ANALYSIS PERFORMED WITH THE CODE. THE TAP AND RECA CODES GIVE GOOD AGREEMENT WITH OTHER ANALYTICAL TOOLS AND APPEAR TO BE USEFUL AND APPROPRIATE FOR THEIR DESIGNED APPLICATIONS. QUANTIFICATION OF THE ACCURACY OF THE CODES WILL REQUIRE FURTHER COMPARISON WITH OPERATING REACTOR CONDITIONS. A VENDOR VERIFICATION PROGRAM FOR THE CODES IS RECOMMENDED.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 01/27/79 ACTUAL RESP. DATE: 02/01/79 USER OFFICE REVIEWER: R. L. TEDESCO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

1. (SORS) THE RIL DESCRIBES WORK PERFORMED BY BNL TO EVALUATE SORS, A CODE DEVELOPMENT BY GENERAL ATOMIC FOR THE ANALYSIS OF FISSION PRODUCT RELEASE FROM HTGR CORES UNDER TRANSIENT CONDITIONS INVOLVING CORE HEATUPS. A TOPICAL REPORT GA-A12462, WAS SUBMITTED TO NRR FOR REVIEW WITH THE INTENTION THAT, AFTER BEING ACCEPTED, THE CODE COULD BE USED AND REFERENCED FOR SAFETY ANALYSES RELATED TO LICENSING OF COMMERCIAL HTGRS.
2. (OXIDE-3) THE RIL DESCRIBES WORK PERFORMED BY BNL TO EVALUATE OXIDE-3, A CODE DEVELOPED BY GENERAL ATOMIC FOR THE ANALYSIS OF HTGR STEAM OR AIR INGRESS ACCIDENTS. A TOPICAL REPORT, GA-A12493, WAS SUBMITTED FOR REVIEW TO NRR WITH THE INTENTION THAT, AFTER BEING ACCEPTED, THE CODE COULD BE USED FOR SAFETY ANALYSES RELATED TO LICENSING OF COMMERCIAL HTGR'S.
3. (TAP AND RECA) NRR IS PRESENTLY SCHEDULED TO REVIEW THE RECA-3 CODE IN FY 1979. THE RESULTS AND CONCLUSIONS OF THE ORNL REPORT ORNL-NUREG/TM-178, "EVALUATION OF THE GENERAL ATOMIC CODES TAP AND RECA FOR HTGR ACCIDENT ANALYSIS" WILL BE FACTORED INTO THIS REVIEW.

*** NRR : IMPACT OF RESULTS ***

1. CONFIRMATORY. NRR'S REVIEW OF THE SORS REPORT AND THE MAXIMUM HYPOTHETICAL FISSION PRODUCT RELEASE (MHFPR) MODELS AND DATA HAD PROCEEDED FAR ENOUGH AT THE TIME OF CURTAILMENT OF HTGR LICENSING ACTIVITY (1976) TO PERMIT SOME CONCLUSIONS REGARDING THE UTILITY OF THE CODE. THESE CONCLUSIONS WERE PRESENTED IN THE REACTOR FUELS INPUT TO THE GASSAR ISER (DECEMBER 15, 1976). THE STATEMENTS IN RIL #36 SORS ARE IN GENERAL AGREEMENT WITH, AND THUS CONFIRMATORY OF, NRR'S ASSESSMENT IN THE GASSAR ISER.
2. CONFIRMATORY. NRR'S REVIEW OF THE OXIDE-3 REPORT HAD PROCEEDED THROUGH THE 2ND ROUND QUESTION STAGE BEFORE CURTAILMENT OF GAS-REACTOR LICENSING ACTIVITY. AT THAT POINT SUFFICIENT REVIEW HAD BEEN CONDUCTED TO ALLOW A PARTIAL EVALUATION OF THE CODE. THE LICENSING EVALUATION IS PRESENTED IN THE REACTOR FUELS INPUT TO THE GASSAR ISER (DECEMBER 15, 1976). THE RESULTS OF THE ASSESSMENT REPORTED IN RIL #36 ARE ESSENTIALLY THE SAME AS, AND THEREFORE CONFIRM, THE NRR ASSESSMENT OF THE OXIDE-3 CODE IN 1976.
3. THE ORNL REPORT IDENTIFIED A NUMBER OF CONCERNS WHICH NRR WILL LOOK INTO DURING THE SCHEDULED REVIEW OF THE RECA 3 CODE. NRR IS PRESENTLY NOT SCHEDULED TO REVIEW THE TAP CODE. THE ORNL REVIEW WILL BE STRONGLY RELIED UPON REGARDING THE INTERFACE BETWEEN THE TAP AND RECA 3 CODES.

*** NRR : COMMENTS AND REMARKS ***

1. AS INDICATED IN THE GASSAR ISER, FOR LICENSING PURPOSES NRR ADVOCATES THE ASSUMPTION OF INSTANTANEOUS RELEASE OF FISSION PRODUCTS FROM FAILED PARTICLES TO THE PRIMARY COOLANT. IN EFFECT, THIS ASSUMPTION RENDERS MOST THE SORSG MODELS, BECAUSE SORSG MODELS TIME-DEPENDENT FISSION PRODUCT RELEASE AND TRANSPORT. THIS ASSUMPTION WAS JUSTIFIED IN THE GASSAR ISER PRIMARILY ON THE BASIS OF A POOR DATA BASE FOR FISSION PRODUCT RELEASE AND TRANSPORT IN HTGR FUEL MATERIALS. THE WORK REPORTED IN RIL #36 PROVIDES ADDITIONAL SUPPORT FOR THE VALIDITY OF THESE LICENSING ASSUMPTIONS. IN VIEW OF THE LACK OF HTGR LICENSING ACTIVITY, HOWEVER, NRR ENVISIONS NO FURTHER NEAR-TERM UTILIZATION OF THE SORS INFORMATION IN THE REGULATORY PROCESS.
2. THE COMPARISON AND APPARENT GOOD AGREEMENT OF OXIDE-3 WITH THE GOPTWO CODE (REPORTED IN RIL #36) DOES NOT PROVIDE CONCLUSIVE EVIDENCE OF THE ABILITY OF OXIDE-3 TO PERFORM ITS STATED FUNCTION, VIZ. TRANSIENT ANALYSIS OF STEAM AND AIR INGRESS EVENTS, BECAUSE, IN CONTRAST TO OXIDE-3, GOPTWO IS A STEADY-STATE CODE. SINCE THE TWO CODES WERE DESIGNED FOR DIFFERENT FUNCTIONS, MEANINGFUL COMPARISON OF THE CODES COULD BE ACCOMPLISHED ONLY OVER A RELATIVELY NARROW RANGE OF EVENT CONDITIONS AND ASSUMPTIONS. IN VIEW OF THE LACK OF HTGR LICENSING ACTIVITY, NRR ENVISIONS NO NEAR-TERM UTILIZATION OF THE INFORMATION ON OXIDE-3 TO THE REGULATORY PROCESS, BEYOND THE PARTIAL CONFIRMATION IT PROVIDES, AS DESCRIBED HERE.
3. NONE

RIL NO: 78-037 **DATE ISSUED**: 09/29/78 **RIL TITLE**: LOFT REACTOR SAFETY PROGRAM RESEARCH RESULTS THROUGH 10-1-78

RESEARCH REVIEW GROUP NO.: 1-01 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

LOFT REACTOR SAFETY PROGRAM RESEARCH RESULTS THROUGH OCTOBER 1, 1978

RES COMMENTS

THE LOFT RESEARCH PROGRAM HAS BEEN DEVELOPED TO PROVIDE EXPERIMENTAL INFORMATION RELEVANT TO THE LICENSING CRITERIA FOR LARGE COMMERCIAL PWR'S. THE MAJOR PORTION OF THIS PROGRAM IS DIRECTED AT AN IMPROVED UNDERSTANDING OF THE LOSS-OF-COOLANT ACCIDENT (LOCA) AND THE PERFORMANCE OF EMERGENCY CORE COOLING SYSTEMS USING THERMAL-HYDRAULIC, CORE PHYSICS, STRUCTURAL AND FUEL BEHAVIOR DATA OBTAINED THROUGH A SERIES OF LOSS-OF-COOLANT EXPERIMENTS. THIS RIL IS BASED ON DATA OBTAINED FROM THE FIRST SERIES OF EXPERIMENTS, L1, WHICH WAS PERFORMED IN THE ABSENCE OF NUCLEAR POWER. IN THE FINAL EXPERIMENT OF THIS SERIES, L1-5, THE CORE WAS IN PLACE, BUT IN A SHUTDOWN CONDITION. CONSEQUENTLY, THE RESULTS DERIVED FROM THESE INVESTIGATIONS ARE APPLICABLE ONLY THE THERMAL HYDRAULIC AND STRUCTURAL PHENOMENA ASSOCIATED WITH THE LOCA WITH THE EMERGENCY CORE COOLING (ECC) INJECTION. IN GENERAL, THE RESULTS SUPPORT THE CONSERVATIVE INTENT OF THOSE PORTIONS OF THE EVALUATION MODEL REQUIREMENTS CONTAINED IN THE LICENSING CRITERIA WHICH WERE INVESTIGATED IN THE L1 SERIES. IN PARTICULAR, THE TIME DELAY IN THE DELIVERY OF EMERGENCY CORE COOLANT TO THE LOWER PLENUM DUE TO THE EFFECT OF CONTACT WITH THE HOT METAL SURFACES (THE HOT WALL EFFECT) WAS FOUND TO BE SMALL (0.5 TO 1.0 S). BASED ON THE RELATIVE SURFACE AREA TO VOLUME RATIO OF THE DOWNCOMER, THE HOT WALL EFFECT IN A LPWR SHOULD BE LESS THAN IN LOFT). THE RESULTS OF THE LOFT L1 SERIES ABOVE ARE RECOMMENDED FOR USE BY NRR IN ITS INTERPRETATION AND APPLICATION OF LOCA ECCS EVALUATION MODEL CRITERIA AND RELATED CODES. ALTHOUGH THE DATA ARE LIMITED TO NONNUCLEAR BLOWDOWN CONDITIONS, THE PREDICTIONS TO WHICH DATA COMPARISONS HAVE BEEN MADE HAVE ASSUMED APPROPRIATE INITIAL CONDITIONS AND THEREFORE THE CONCLUSIONS ARE BELIEVED TO BE VALID.

[illegible]

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 02/27/79 ACTUAL RESP. DATE: 01/02/80 USER OFFICE REVIEWER: R. DENISE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE LOFT TEST FACILITY PROVIDES EXPERIMENTAL DATA FOR THE EVALUATION OF COMPUTER PROGRAMS USED TO ANALYZE THE CONSEQUENCES OF POTENTIAL LOSS OF COOLANT ACCIDENTS. THE TEST FACILITY IS SUFFICIENTLY LARGE AND REPRESENTATIVE OF A LARGE PWR TO TEST THE BASIS PHYSICAL PHENOMENA OF A PWR LOCA. THE COMPUTER PROGRAMS ARE USED TO PROVIDE THE EXTRAPOLATION FROM THE TEST CONDITIONS TO FULL SCALE REACTORS.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THE NON-NUCLEAR BLOWDOWN TESTS HAVE BEEN USED TO EVALUATE REACTOR FUEL SUPPLIER AND NRC DEVELOPED COMPUTER PROGRAMS. THESE EVALUATIONS HAVE PROVIDED VALUABLE INFORMATION FOR EVALUATING VARIOUS MODELS IN THE COMPUTER PROGRAM, AND HAVE INDICATED CERTAIN AREAS WHERE THE MODELS COULD BE IMPROVED. IN GENERAL, THE COMPUTER PROGRAMS USED TO PERFORM EVALUATION MODEL CALCULATIONS HAVE BEEN SHOWN TO BE SATISFACTORY FOR THE PURPOSE. EXPERIMENTAL RESULTS FROM THIS PROGRAM DEMONSTRATING ASYMMETRICAL FLOW IN THE DOWNCOMER DURING ECC INJECTION, PRIMARY COOLANT RETENTION IN THE LOWER PLENUM, NEAR ISENTROPIC GAS EXPANSION IN THE ACCUMULATORS DURING ECC INJECTION, AND PRESSURIZER DISCHARGE EFFECTS IN THE FIRST FEW SECONDS BY BLOWDOWN HAVE NOT YET BEEN FULLY IMPLEMENTED IN COMPUTER MODELS. SUCH CHANGES WOULD PROVIDE IMPROVED 'BEST ESTIMATE' SIMULATIONS OF THE LOCA TRANSIENTS IN SUBSEQUENT TESTS.

*** NRR : COMMENTS AND REMARKS ***

THE LOCA COMPUTER PROGRAMS HAVE BEEN EVALUATED AGAINST VARIOUS SPECIAL AFFECTS AND INTEGRATED TEST RESULTS. THE PRIMARY NEED FOR CODE EVALUATION IS COMPARISON WITH A FULLY INTEGRATED TESTS INCORPORATING NUCLEAR FUEL. THE CONTINUATION OF THE NUCLEAR PORTION OF THE LOFT PROGRAM SHOULD PROVIDE MUCH OF THE NEEDED EXPERIMENTAL DATA FOR CODE VERIFICATION. PROMPT IMPLEMENTATION AND CHECKOUT OF MODEL CHANGES MADE TO INTEGRATE INFORMATION LEARNED FROM PREVIOUS TESTS ARE REQUIRED TO DERIVE THE FULL BENEFIT OF INFORMATION LEARNED IN EACH STAGE OF THE EXPERIMENTAL PROGRAM. IT IS NOT APPARENT THAT SUCH AN EFFORT IS BEING MADE FROM THE SUMMARY PRESENTED IN THE RIL.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 02/28/79 ACTUAL RESP. DATE: 01/02/80 USER OFFICE REVIEWER: K. WICHMAN

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE ENGINEERING METHODOLOGY STANDARDS BRANCH WILL USE THESE RESULTS IN THE PHASE II ECCS RULE CHANGE EFFORT.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-038 **DATE ISSUED**: 10/13/78 **RIL TITLE**: RESULT OF INITIAL SER. OF ACPR EXPER. ON PROMPT-BURST ENERG.

RESEARCH REVIEW GROUP NO.: 2-06 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

RESULTS OF THE INITIAL SERIES OF ACPR EXPERIMENTS ON PROMPT-BURST ENERGETICS WITH FRESH OXIDE FUEL

RES COMMENTS

THE RESULTS OF THESE ACPR TESTS ON PROMPT-BURST ENERGETICS GIVE NRR A MUCH IMPROVED DATA BASE FOR ASSESSING THE WORK POTENTIAL AND THE RESULTING THREAT TO THE INTEGRITY OF THE PRIMARY SYSTEM AND EVENTUALLY THERMAL INTERACTION BETWEEN MOLTEN OXIDE FUEL AND SODIUM HAS BEEN DEFINITELY DEMONSTRATED. THE OBSERVED CONVERSION OF FUEL THERMAL ENERGY INTO WORK, HOWEVER, WAS LESS THAN ONE PERCENT.
THE SHOCK-TRIGGERED DELAYED FUEL-SODIUM INTERACTIONS OBSERVED IN THESE EXPERIMENTS RAISE QUESTIONS ABOUT THE POSSIBLE OCCURRENCE OF A LARGE SCALE PROPAGATING FUEL-COOLANT INTERACTION UNDER CORE MELTDOWN CONDITIONS, AS PROPOSED BY BOARD. THE CURRENT EXPERIMENTAL RESULTS DO NOT, HOWEVER, GIVE INFORMATION ON THE EXTENT (MASS INVOLVEMENT) OF SUCH A PROPAGATING INTERACTION OR ON THE WORK POTENTIAL OF SUCH AN INTERACTION. IT IS RECOMMENDED THAT CONSIDERATION BE GIVEN BY NRR TO THESE UNCERTAINTIES AND TO THE CURRENT ABSENCE OF VERIFIED MECHANISTIC MODELS OF FUEL-COOLANT INTERACTIONS WHEN ASSESSING ACCIDENT WORK POTENTIAL.
THE EXPAND FRESH FUEL FAILURE CODE HAS BEEN VERIFIED FOR THE RANGE OF CONDITIONS COVERED BY THESE EXPERIMENTS, AND IS THE BEST ACCIDENT ANALYSIS CODE AVAILABLE FOR THESE CONDITIONS. THE PRE-FAILURE IN-CLAD AXIAL FUEL MOTION PREDICTED BY EXPAND HAS BEEN VERIFIED BY POST-TEST EXAMINATION OF THESE EXPERIMENTS. THIS FUEL MOTION MAY HAVE REACTIVITY EFFECTS THAT ARE SIGNIFICANT IN ASSESSING THE ACCIDENT WORK POTENTIAL AND THE THREAT TO THE INTEGRITY OF THE PRIMARY SYSTEM AND EVENTUALLY THE CONTAINMENT.
EXPAND IS RECOMMENDED TO NRR AS THE BEST AVAILABLE TOOL FOR SAFETY ASSESSMENT FOR FRESH OXIDE FUEL IN THESE AREAS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/15/79 ACTUAL RESP. DATE: 07/19/79 USER OFFICE REVIEWER: J. MEYER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THERE IS NO DIRECT APPLICATION OF THE RESULTS OF THE INITIAL SERIES OF PBE EXPERIMENTS TO THE REGULATORY PROCESS. THE EXPERIMENTS ARE FIRST GENERATION AND ARE DIFFICULT TO INTERPRET. NOTHING CONCLUSIVE CAN BE SAID FROM THESE EXPERIMENTS REGARDING SHOCK-PRESSURE TRIGGERING OF SIGNIFICANT FUEL COOLANT INTERACTIONS.

*** NRR : IMPACT OF RESULTS ***

EXPERIMENTAL RESULTS LEADING TO A BETTER UNDERSTANDING OF FCI PHENOMENA AND PROPAGATION MECHANISMS WILL HAVE SIGNIFICANT IMPACT ON UNDERSTANDING OF LOW PROBABILITY HIGH CONSEQUENCE ACCIDENTS AND THEREBY ON LICENSING. THESE EXPERIMENTS, IN AND OF THEMSELVES, CONTRIBUTE LITTLE BUT DO OFFER A STARTING POINT IN THE DIRECTION OF PROVIDING UNDERSTANDING OF FCI PHENOMENA.

*** NRR : COMMENTS AND REMARKS ***

NONE

RESEARCH PROJECT CONTROL SYSTEM
RESEARCH RESULTS UTILIZATION REPORT
** ISSUED RILS **

RIL NO: 78-039 DATE ISSUED: 11/27/78 RIL TITLE: RELAP-4/MOD 6

RESEARCH REVIEW GROUP NO.: 1-16 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

RELAP-4/MOD 6

RES COMMENTS

MOD 6 RETAINS ALL OF THE CAPABILITY OF PRIOR VERSIONS AND, IN ADDITION, CONTAINS NEW BEST ESTIMATE (BE) BLOWDOWN HEAT TRANSFER MODELS, BE REFLOOD CAPABILITY, AND OTHER MODIFICATIONS. RELAP-4/MOD 6 WAS DEVELOPED TO PROVIDE CAPABILITY FOR A PWR STATISTICAL LOCA STUDY AND FOR SENSITIVITY STUDIES TO ASSESS DATA PERTAINING TO LOCA RULE CHANGES AND TO IMPROVE BLOWDOWN AND REFLOOD UNDERSTANDING AND PROVIDE QUANTITATIVE APPRAISALS OF ECCS. MOD 6 IS AN EXTENSION OF PRIOR LOCA CODE CAPABILITY TO ALLOW MODELING OF LWR AND EXPERIMENTAL FACILITY REFLOOD PHENOMENA, IN ADDITION TO CALCULATION OF THE BLOWDOWN PHASE OF THE EVENT. RES IS APPLYING THE CODE TO THE UNCERTAINTY STUDY REQUESTED BY NRR, AS WELL AS TO INTERPRETATION OF TEST RESULTS FROM LOCA FACILITIES. THE RELAP-4/MOD 6 CODE IS RECOMMENDED FOR THE BEST ESTIMATE CALCULATIONS OF BLOWDOWN AND REFLOOD.
RELAP-4/MOD 6 IS NOT RECOMMENDED FOR REFILL ANALYSES BECAUSE OF THE DIFFICULTIES ASSOCIATED WITH THE NON-EQUILIBRIUM PHENOMENA WHICH ARE NOT MODELED. DOWNCOMER MODELING IS ALSO A PROBLEM, AND THE CODE DOES NOT MODEL NITROGEN FLOW IF THE ACCUMULATOR SHOULD EMPTY DURING THE ECC BYPASS AND REFILL PHASE OF THE EVENT. AS WITH MOD 5, THE CODE IS VERY SLOW RUNNING DURING REFILL, GIVING CALCULATED RESULTS WHICH ARE NOT SATISFACTORY. THIS CODE IS NOT RECOMMENDED FOR STEAM GENERATOR TUBE BREAK INVESTIGATIONS, ALTHOUGH USER GUIDELINES ARE BEING DEVELOPED TO ATTEMPT LIMITED INVESTIGATIONS WITH MOD 6.

MOD 6 HAS BEEN SENT TO THE ARGONNE CODE CNETER, FRANCE (NEA FOR EUROPEAN DISTRIBUTION), ITALY, NRC, ORNL AND SANDIA. IT IS IN USE ON A NUMBER OF NRC-FUNDED PROGRAMS INCLUDING ANALYSIS OF SEMISCALE MODE 3, LOFT, AND PKL, AND PLANS ARE BEING IMPLEMENTED FOR ITS APPLICATION TO STANDARD PROBLEMS. THE FOREIGN AND DOMESTIC RECIPIENTS OF RELAP-4/MOD 6 WILL BE ADVISED OF THE CODE ASSESSMENT.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/30/79 ACTUAL RESP. DATE: 01/02/80 USER OFFICE REVIEWER: R. DENISE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

RELAP-4/MOD 6 IS DESIGNED TO PERFORM A 'BEST ESTIMATE' CALCULATION OF PWR LOCA'S. THE CODE IS USED TO PERFORM PRE- AND POST-TEST ANALYSES OF LOCA EXPERIMENTS TO CONFIRM THE ADEQUACY OF THERMO AND HYDRODYNAMIC MODELS USED TO COMPUTE LOCA TRANSIENTS. ON THE BASIS OF OUTPUT COMPARISONS BETWEEN 'BEST ESTIMATE' AND 'EVALUATION MODEL' CODE CALCULATIONS, THE MARGINS OF CONSERVATISM IN 'EVALUATION MODEL' CALCULATIONS CAN BE ASSESSED.

*** NRR : IMPACT OF RESULTS ***

THE RELAP-4/MOD 6 CODE DEVELOPMENT IS AN EXTENSION OF EARLIER DEVELOPMENT EFFORTS ON RELAP-4/MOD 5. MANY IMPROVEMENTS CONFIRMED IN MOD 6 WOULD BE USEFUL AND APPLICABLE FOR 'EVALUATION MODEL' CALCULATIONS, BUT CANNOT BE USED FOR LICENSING AUDIT STUDIES UNTIL MOD 6 IS FURTHER MODIFIED TO INCLUDE 'EVALUATION MODEL' FEATURES. THE PRIMARY IMPACT OF THE MOD 6 DEVELOPMENT IS IN PROVIDING A 'BEST ESTIMATE' BASE FOR ASSESSING THE CONSERVATISM OF THE PRESENT 'EVALUATION MODEL' IN MOD 5 TO BE USED IN AUDIT STUDIES OF VENDOR ANALYSES FOR PWR'S, AND IN PROVIDING AN ANALYTICAL UNDERSTANDING OF VARIOUS EXPERIMENTAL PROGRAMS.

*** NRR : COMMENTS AND REMARKS ***

THE PRIMARY AREA OF IMPROVEMENTS IN MOD 6 OVER THE MOD 5 VERSION IS IN THE REFLOOD PHASE OF THE PWR LOCA WHERE MORE DETAILED THERMO AND HYDRODYNAMIC MODELS ARE EMPLOYED TO COMPUTE THE ADVANCE OF FLUID UP THROUGH THE CORE IN THE REFLOOD TRANSIENT. COMPARISONS WITH TEST RESULTS, SHOW GOOD HYDRODYNAMIC AGREEMENT, BUT ONLY BROADLY ACCEPTABLE THERMODYNAMIC AGREEMENT, BOTH OF WHICH ARE BETTER THAN CAN BE OBTAINED FROM MOD 5.

RIL NO: 78-040 DATE ISSUED: 12/18/78 RIL TITLE: THE COMPUTER CODE BRENDA

RESEARCH REVIEW GROUP NO.: 2-13 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THE COMPUTER CODE BRENDA - A COMPUTER PROGRAM FOR THE DYNAMIC SIMULATION FOR A LIQUID METAL FAST BREEDER REACTOR PLANT

RES COMMENTS

BRENDA IS A FAST RUNNING SYSTEM CODE INTENDED TO PROVIDE NRC WITH THE CAPABILITY OF DOING QUICK PARAMETRIC SURVEYS AND STUDIES OF NORMAL OPERATING AS WELL AS ACCIDENTAL TRANSIENTS IN LMFBR PLANTS. THE CODES PROVIDE NRC WITH AN INDEPENDENTLY DERIVED TOOL FOR SAFETY ASSESSMENT. IT IS CURRENTLY BEING MODIFIED TO MAKE IT APPLICABLE TO PREOPERATIONAL AND STARTUP TESTS IN FFTF.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/25/79 ACTUAL RESP. DATE: 11/13/79 USER OFFICE REVIEWER: J. MEYER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SINCE THERE IS NO LMFBR LICENSING ACTIVITY AT THE PRESENT TIME, THERE IS NO IMMEDIATE APPLICATION OF THIS COMPUTER CODE TO THE REGULATORY PROCESS. HOWEVER, IF THE LMFBR LICENSING AGAIN BECOMES ACTIVE, THIS PROGRAM HAS POTENTIAL APPLICATION IF THE CLAIMS REGARDING ITS UTILITY ARE, IN FACT, REALIZED.

*** NRR : IMPACT OF RESULTS ***

THIS RIL ONLY DESCRIBES THE COMPUTER CODE ITSELF (TOGETHER WITH A COMPARISON BETWEEN BRENDA AND SSC) AND THUS THERE ARE NO 'RESULTS' WHICH NRR CAN EVALUATE AND ASSESS. THE IMPACT OF THIS CODE WILL ONLY BE CONTRIBUTORY IF: A) IT TURNS OUT TO BE FAST-RUNNING FOR IMPORTANT APPLICATIONS; B) IT ADEQUATELY TRACKS SYSTEM BEHAVIOR AS MEASURED AGAINST A MORE DETAILED, MECHANISTIC SYSTEMS CODE SUCH AS SSC; AND C) THE DETAILED SYSTEMS CODE ON WHICH IT IS BASED HAS BEEN PROPERLY VERIFIED.

*** NRR : COMMENTS AND REMARKS ***

NONE

RIL NO: 78-041 DATE ISSUED: 12/19/78 RIL TITLE: LAB. TEST PROCEDURES OF CYCLIC STRENGTH OF SOILS

RESEARCH REVIEW GROUP NO.: 3-01 0-00 SPONSORING OFFICE(S): SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

LABORATORY TESTING PROCEDURES TO DETERMINE THE CYCLIC STRENGTH OF SOILS

RES COMMENTS

WIDELY VARYING RESULTS WERE BEING OBTAINED IN TESTING SOILS FOR LIQUEFACTION POTENTIAL (CYCLIC STRENGTH OF SOILS) BECAUSE STANDARD TEST PROCEDURES DID NOT EXIST. HENCE, THE SUBJECT STUDY WAS CONDUCTED IN RESPONSE TO THIS FACT, AND BECAUSE STANDARD PROCEDURES ARE NEEDED FOR NUCLEAR POWER PLANT SITE INVESTIGATIONS. THE RESEARCH PROGRAM WAS CONDUCTED IN CONJUNCTION WITH DEVELOPMENT OF ASTM PERFORMANCE SPECIFICATIONS.

MAJOR SOIL MECHANICS LABORATORIES THROUGHOUT THE WORLD WERE CONTACTED TO DETERMINE THEIR TESTING METHODS AND TO EVALUATE THE CYCLIC TRIAXIAL EQUIPMENT IN USE. THIS INFORMATION PROVIDED A BASIS TO DEVELOP THE TEST PROCEDURES FOR STRESS-CONTROLLED CYCLIC TRIAXIAL STRENGTH TESTS PRESENTED AS A PERFORMANCE SPECIFICATION SO THAT A GEOTECHNICAL TESTING LABORATORY CAN: 1) ENSURE THAT ITS TEST EQUIPMENT AND PROCEDURES MEET REQUIRED STANDARDS, AND 2) CHECK THAT RESULTS AGREE REASONABLY WITH RESULTS OBTAINED BY OTHER LABORATORIES.

RESEARCH RESULTS PRESENT RECOMMENDED PROCEDURES FOR LIQUEFACTION POTENTIAL TESTING BY USE OF STATE-OF-THE-ART TESTING TECHNIQUES AS A PERFORMANCE SPECIFICATION.

IT IS RECOMMENDED THAT NUREG-0031 BE USED AS GUIDELINES BY THE OFFICE OF STANDARDS DEVELOPMENT IN DEVELOPMENT OF APPLICABLE REGULATIONS AND REGULATORY GUIDES, BY THE OFFICE OF NUCLEAR REACTOR REGULATION TO ASSIST IN THE REVIEW OF NUCLEAR POWER PLANT OPERATING APPLICATIONS, AND BY THE APPLICANT AS A STANDARD IN THE ASSESSMENT OF LIQUEFACTION POTENTIAL OF FOUNDATION SOILS AT NUCLEAR POWER PLANT SITES.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 04/19/79 ACTUAL RESP. DATE: 12/27/78 USER OFFICE REVIEWER: R. MINOGUE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE INFORMATION IN THIS REPORT WAS USED AND REFERENCED IN REGULATORY GUIDE 1.138, "LABORATORY INVESTIGATIONS OF SOILS FOR ENGINEERING ANALYSIS AND DESIGN OF NUCLEAR POWER PLANTS". IT WAS ALSO USED IN THE DEVELOPMENT OF A DRAFT REGULATORY GUIDE ON, "PROCEDURES AND CRITERIA FOR ASSESSING SOIL LIQUEFACTION POTENTIAL AT NUCLEAR FACILITY SITES," WHICH WILL BE PUBLISHED FOR COMMENT IN THE NEAR FUTURE. COPIES OF THE REPORT WERE WIDELY DISTRIBUTED TO MEMBERS OF THE ASTM, D-18 COMMITTEE ON SOIL AND ROCK ENGINEERING AND WILL BE USED AS ONE OF THE BASES FOR DEVELOPING A NATIONALLY ACCEPTABLE DYNAMIC TRIAXIAL TESTING STANDARD FOR SOILS

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 78-042 DATE ISSUED: 12/20/78 RIL TITLE: CRITICAL EXPERIMENT PROGRAM FOR NEUTRONICS CODE VERIFICATION

RESEARCH REVIEW GROUP NO.: 2-13 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

CRITICAL EXPERIMENT PROGRAM FOR NEUTRONICS CODE VERIFICATION

RES COMMENTS

THIS PROGRAM OF DISTORTED GEOMETRY CRITICAL EXPERIMENTS WAS PLANNED AND CARRIED OUT TO PROVIDE BENCHMARKS FOR THE VALIDATION OF THE NEUTRONICS PART OF CODES USED IN SAFETY ANALYSIS SUCH AS SIMMER. A SECOND OBJECTIVE IS TO VALIDATE THE VIM MONTE CARLO CODE FOR USE AS A SECONDARY STANDARD FOR VALIDATION OF OTHER NEUTRONICS METHODS.

MELTDOWN CONFIGURATIONS IN LMFBRS CAN BE EXPECTED TO HAVE REGIONS WITH HIGH FUEL CONCENTRATIONS GIVING EXTREME SPECTRAL CHANGES AND LARGE REGIONS OF VOID GIVING RISE TO LARGE STREAMING PATHS. NEUTRONICS METHODS OTHER THAN MONTE CARLO HAVE DIFFICULTY IN CALCULATING THESE CONFIGURATIONS ACCURATELY. A SERIES OF EXPERIMENTS WAS NEEDED TO DETERMINE THE IMPORTANCE OF THESE DIFFICULTIES AND TO PROVIDE A BASIS FOR IMPROVING THE ACCURACY AND RELIABILITY OF ACCIDENT ANALYSIS METHODS. THIS PROGRAM HAS DEMONSTRATED THAT DIFFUSION THEORY NEUTRONICS CALCULATIONS WOULD UNDERPREDICT RAMP RATES WHICH MIGHT OCCUR IN A MELTDOWN AND COULD BE NON-CONSERVATIVE.

THE RESULTS OF THE PROGRAM LEAD TO CONCLUSION THAT DIFFUSION THEORY CALCULATIONS LEAD TO NON-CONSERVATIVE ESTIMATION OF REACTIVITY GOING FROM THE REFERENCE TO THE SLUMPED CONFIGURATIONS. THE SIGNIFICANCE OF THE RAMP RATE AT PROMPT CRITICAL IN AN HCDA CALCULATIONS HAS BEEN POINTED OUT BY THE NRR STAFF IN NUREG-0122(1).

DATA REDUCTION AND PREPARATION OF THE FINAL REPORT WILL BE COMPLETED IN FY 1979. A VIM MONTE CARLO CALCULATION ON CONFIGURATION 2 SODIUM VOIDED TEST ZONE WILL BE MADE AND THE SN CASES NOT SHOWN ON FIGURE 2 OF ZPR-TM-327 WILL BE COMPLETED.

ANALYSIS TO RESOLVE CROSS SECTION DIFFICULTIES THAT CAUSE DIFFERENCES BETWEEN EXPERIMENT AND VIM MONTE CARLO EIGENVALUES IS NEEDED. WHEN AND IF THE CROSS SECTION DIFFICULTIES ARE RESOLVED, IT WOULD BE DESIRABLE TO PREPARE SECONDARY BENCHMARK VIM MONTE CARLO CALCULATIONS USING A HOMOGENIZED MODEL OF THE EXPERIMENTAL CONFIGURATION.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/20/79 ACTUAL RESP. DATE: 11/09/79 USER OFFICE REVIEWER: J. MEYER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

BECAUSE THERE IS NO LMFBR BEING LICENSED, THERE IS NO IMMEDIATE APPLICATION TO THE REGULATORY PROCESS. HOWEVER, SINCE CORE DISTRIBUTION ACCIDENT ANALYSIS WILL PLAY AN IMPORTANT PART IN FUTURE LMFBR LICENSING, THERE IS A REGULATORY NEED FOR RES EXPERIMENTAL PROGRAMS DIRECTED TO ACCIDENT ANALYSIS-CODE VERIFICATION. THIS PROGRAM IS ONLY A VERY SMALL PART OF THE TOTAL CODE VERIFICATION PROGRAM AND ITS UTILITY AND APPLICATION WILL ONLY BE REALIZED WHEN LARGER (AND MORE IMPORTANT) PARTS OF THE VERIFICATION PROGRAM (E.G., SIMMER THERMAL HYDRAULICS) ARE COMPLETED.

*** NRR : IMPACT OF RESULTS ***

NRR VIEWS THE IMPACT OF THESE RESULTS TO BE SIGNIFICANT: BUT OF SECONDARY OVERALL IMPORTANCE, WHEN JUDGED RELATIVE TO THE IMPACT OF UNKNOWNS AND UNCERTAINTIES WHICH STILL EXIST IN THE THERMAL HYDRAULICS ANALYSIS OF CORE DISRUPTION. A "SIMMER" TYPE ANALYSIS, WHICH WOULD TAKE INTO ACCOUNT THE NEUTRONIC-CALCULATION UNCERTAINTIES WHICH HAVE SURFACED AS A RESULT OF THIS STUDY, WOULD BE HELPFUL IN UNDERSTANDING THE OVERALL IMPACT. SIMILAR ASSESSMENTS USING SAS AND VENUS WOULD ALSO BE HELPFUL.

*** NRR : COMMENTS AND REMARKS ***

NONE

RIL NO: 79-043 **DATE ISSUED**: 01/10/79 **RIL TITLE**: SYS. CODE, A COMPUTER PROG. FOR SIMUL., LMFBR PWR. PLANTS

RESEARCH REVIEW GROUP NO.: 2-13 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

SUPER SYSTEM CODE, A COMPUTER PROGRAM FOR DYNAMIC SIMULATION OF LMFBR POWER PLANTS

RES COMMENTS

THE SUPER SYSTEMS CODE (SSC-L) IS SPECIFICALLY DIRECTED TO THE ANALYSIS OF THE ADEQUACY OF NATURAL CIRCULATION IN SODIUM-COOLED REACTORS TO PREVENT CLAD MELTING. THE CODE ALSO HAS THE CAPABILITY TO ANALYZE NORMAL OPERATING TRANSIENTS AND LESS SEVERE ACCIDENTS THAT DO NOT BREACH THE INTEGRITY OF THE SYSTEM OR FUEL. THE CODE IS OPERATIONAL ON THE BNL-CDC-7600 COMPUTER AND CAN BE OPERAED THROUGH THE NRC TERMINALS AT THE PHILLIPS AND WILLSTE BUILDINGS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/10/79 ACTUAL RESP. DATE: 10/11/79 USER OFFICE REVIEWER: W. RUSSELL

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THERE IS NO IMMEDIATE APPLICATION OF SSC TO THE REGULATORY PROCESS (SINCE THERE IS NO LMFBR LICENSING ACTIVITY) EXCEPT FOR THE SSC VERIFICATION ACTIVITIES ASSOCIATED WITH THE FFTF NATURAL CIRCULATION TESTS. IF LMFBR LICENSING AGAIN BECOMES ACTIVE, IT WILL BE IMPORTANT TO HAVE AN INDEPENDENT, VERIFIED, THERMAL-HYDRAULICS SYSTEMS CODE IN PLACE.

*** NRR : IMPACT OF RESULTS ***

PRESENT IMPACT IS MINIMAL BECAUSE OF LACK OF LMFBR LICENSING ACTIVITY. THE IMPACT OF THE VERIFICATION ACTIVITIES ASSOCIATED WITH FFTF NATURAL CIRCULATION TESTS MAY BE IMPORTANT DEPENDING ON TEST OUTCOME.

*** NRR : COMMENTS AND REMARKS ***

AT THE PRESENT TIME IANUS AND DEMO ARE THE TWO CODES USED FOR THE THERMAL HYDRAULIC ANALYSIS OF FFTF AND CRBR. BOTH CODES HAVE BEEN DEVELOPED BY WESTINGHOUSE. DEVELOPMENT OF SSC-L IS A SPECIFIC CONFIRMATORY RESEARCH EFFORT WITH APPLICATION OF FFTF. THE (P) AND (S) VERSIONS OF SSC HAVE FUTURE APPLICATION FOLLOWING THE DEVELOPMENT OF THE (L) VERSION.

RIL NO: 79-044 **DATE ISSUED**: 01/04/79 **RIL TITLE**: RADIATION DOSE TO CONSTR. WORKERS AT OPER. NUC. PWR. PLANTS

RESEARCH REVIEW GROUP NO.: 5-23 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

RADIATION DOSE TO CONSTRUCTION WORKERS AT OPERATING NUCLEAR POWER PLANT SITES

RES COMMENTS

THE STUDY PROVIDES A DATA BASE WHICH ALLOWS A REALISTIC ASSESSMENT OF THE RADIOLOGICAL IMPACT ON CONSTRUCTION WORKERS OF PROPOSED MULTI-UNIT NUCLEAR POWER PLANTS. MEASUREMENTS OF PERSONNEL EXPOSURE OF SEVERAL HUNDRED CONSTRUCTION WORKERS WERE CONDUCTED AT EACH OF THE FOUR SITES WHERE NEW FACILITIES WERE UNDER CONSTRUCTION NEXT TO OPERATING NUCLEAR POWER PLANTS. FOR MOST WORKER GROUPS, THE AVERAGE DOSE EQUIVALENT RATES WERE MUCH LESS THAN 10 MREM/MONTH GREAER THAN OFF-SIE CONTROLS. CORRELATIONS BETWEEN OPERATING PLANT POWER LEVELS AND DOSIMETER READINGS WERE GENERALLY POOR INDICATING THAT VARIATIONS IN OTHER RADIATION SOURCES HAD GREATER EFFECT ON THE MEASUREMENTS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/04/79 ACTUAL RESP. DATE: 06/13/79 USER OFFICE REVIEWER: C. S. HINSON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

AS PART OF ITS LICENSING REVIEW PROCESS, THE NRC MUST ASSESS THE ENVIRONMENTAL IMPACT OF THE CONSTRUCTION AND OPERATION OF NUCLEAR POWER PLANTS. ASSESSMENT OF RADIATION DOSES TO CONSTRUCTION WORKERS AT OPERATING NUCLEAR POWER PLANT SITES IS PART OF THIS REVIEW. SINCE A FIRM DATA BASE FOR RADIATION DOSES TO CONSTRUCTION WORKERS WAS NOT AVAILABLE, ENVIRONMENTAL IMPACT STATEMENTS COULD ONLY PROVIDE ROUGH ESTIMATES FOR THE DOSES TO CONSTRUCTION WORKERS. THE RESULTS OF THIS STUDY PROVIDE RADIATION EXPOSURE DATA SUCH THAT A REASONABLE ENVIRONMENTAL IMPACT STATEMENT CAN BE MADE.

*** NRR : IMPACT OF RESULTS ***

UNTIL THE PUBLICATION OF THIS REPORT, THERE HAS BEEN LITTLE DATA WHICH THE STAFF COULD USE IN ASSESSING THE APPLICANT'S ESTIMATE OF CONSTRUCTION WORKER DOSES DURING NUCLEAR POWER PLANT CONSTRUCTION. THE RESULTS OF THIS STUDY SHOW THAT MOST CONSTRUCTION WORKERS AT OPERATING NUCLEAR POWER PLANTS RECEIVED LESS THAN 10 MILLIREMS PER MONTH; AND NO WORKER'S ESTIMATED DOSE EXCEEDED 500 MILLIREMS PER YEAR. THESE RESULTS INDICATE THAT CONSTRUCTION WORKERS AT OPERATING REACTOR SITES ARE NOT LIKELY TO RECEIVE SIGNIFICANT RADIATION DOSES, AND THEREFORE THAT INDIVIDUAL MONITORING WILL NOT BE REQUIRED. HOWEVER, IT MAY BE APPROPRIATE TO PLACE DOSIMETERS AT POINTS WHERE THE HIGHEST EXPOSURE RATES ARE TO BE EXPECTED, TO ASSURE THAT UNUSUALLY HIGH EXPOSURE RATES DO NOT GO UNDETECTED.

*** NRR : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

90

RIL NO: 79-045 DATE ISSUED: 02/11/79 RIL TITLE: THE CONCEPT COMPUTER CODE AND CAPITAL COSTS FOR BWR PLANTS

RESEARCH REVIEW GROUP NO.: 5-21 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THE CONCEPT COMPUTER CODE AND CAPITAL COSTS FOR BOILING WATER REACTOR PLANTS

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH UPDATING AND EXPANDING THE CONCEPT COMPUTER CODE FOR FORECASTING CAPITAL COSTS OF BOILING WATER REACTOR PLANTS. IN 1971 THE ATOMIC ENERGY COMMISSION AUTHORIZED POWER PLANT INVESTMENT COST STUDIES, WHICH CULMINATED IN THE WASH-1230 REPORTS PUBLISHED IN 1972. THEIR PURPOSE WAS TO FACILITATE POLICY AND ECONOMIC DECISIONS ABOUT ELECTRIC GENERATION FACILITIES IN THE PUBLIC AND PRIVATE SECTORS. NATIONAL PRIORITIES ON ENERGY, THE REGULATORY ENVIRONMENT AND THE COST OF LABOR, EQUIPMENT AND MATERIAL HAVE CHANGED SIGNIFICANTLY. THESE CHANGES DICTATED THE NECESSITY OF UPDATING THIS SERIES, AND EXPANDING THE SCOPE TO CONSIDER THE FUEL CYCLE AND THE TOTAL GENERATING COST. AS A RESULT, A PROGRAM TO STUDY, REASSESS AND PRODUCE A NEW SET OF UPDATED REPORTS WAS AUTHORIZED AND UNDERTAKEN.

THE STUDIES IN THESE SERIES HAVE A UNIFORM SET OF ECONOMIC AND TECHNICAL CRITERIA AND A UNIFORM ACCOUNTING SYSTEM. THE INVESTMENT COST ESTIMATES IN THESE SERIES ARE DEVELOPED FOR REFERENCE PLANTS CONSTRUCTED AT A HYPOTHETICAL SITE. THE ESTIMATED TOTAL BASE CONSTRUCTION COST FOR THE 1190 MWE BWR REFERENCE DESIGN IS $582,748,330 OR $490/KW BASED ON JULY 1, 1976 PRICES. THE TOTAL BASE CONSTRUCTION COST FOR THE BWR POWER PLANT (1061 MWE NET OUTPUT) REFERENCE IN WASH-1230 WAS APPROXIMATELY $213,000,000 OR $201/KW, BASED UPON PRICES EFFECTIVE JANUARY 1971. THUS, THE 1977 STUDY INDICATES APPROXIMATELY A 143 PERCENT INCREASE IN THE COST OF THE PLANT IN TERMS OF $/KW. THE TOTAL DIRECT CRAFT LABOR COST OF APPROXIMATELY $139,500,000 CORRESPONDS TO AN AVERAGE HOURLY RATE OF $12.29. APPROXIMATELY 11,350,000 CRAFT LABOR MANHOURS AVERAGE ABOUT 9.5 MANHOURS/KW. THESE COMPARE TO AVERAGES OF $8.84/HOUR AND 6.3 MANHOURS/KW RESPECTIVELY FOR THE EARLIER DESIGN REPORTED IN WASH-1230.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 06/11/79 ACTUAL RESP. DATE: 06/08/79 USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PRINCIPAL APPLICATION OF THE INVESTMENT COST DATA IS TO UPDATE THE CONCEPT COMPUTER CODE. IN TURN THE CONCEPT CODE IS USED TO ESTIMATE CAPITAL COST FOR DIFFERENT SIZE PLANTS, DIFFERENT REGIONS OF THE COUNTY, DIFFERENT SCHEDULE LENGTH, DIFFERENT COMPLETION DATES, DIFFERENT ESCALATION AND INTEREST RATES. IN ADDITION TO UPDATING CONCEPT THE DATA IS USED AS A GENERAL REFERENCE FOR SUCH THINGS AS, COST OF COMPONENTS, QUANTITIES OF MATERIALS USED, TYPE AND QUANTITY OF LABOR, ETC.

*** NRR : IMPACT OF RESULTS ***

DURING FY 1977 44 REQUESTS WERE MADE FOR CONCEPT CODE RUNS AND 32 REQUESTS WERE MADE IN 1978. MOST REQUESTS INVOLVED RUNS FOR SEVERAL SIZES OF COAL PLANTS AND ONE OR TWO NUCLEAR UNITS FOR DIFFERENT ESCALATION AND INTEREST RATES. THE USE OF THE CONCEPT CODE PERMITTED THE STAFF TO PERFORM THESE ANALYSES MORE EFFICIENTLY AND QUICKLY THAN IF THE CONCEPT CODE WERE NOT AVAILABLE.

*** NRR : COMMENTS AND REMARKS ***

DOE IS FUNDING THE LATEST UPDATE.

RIL NO: 79-046 DATE ISSUED: 02/12/79 RIL TITLE: EFFECTIVENESS OF CABLE TRAY COATING MATEIALS & BARRIERS

RESEARCH REVIEW GROUP NO.: 1-23 0-00 SPONSORING OFFICE(S): SD, NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A1010	FIRE PROTECTION RESEARCH		NOTLEY D

RIL SUBJECT/DESCRIPTION

THE EFFECTIVENESS OF CABLE TRAY COATING MATERIALS AND BARRIERS IN RETARDING THE COMBUSTION OF CABLE TRAYS SUBJECTED TO EXPOSURE FIRES AND IN PREVENTING PROPAGATION BETWEEN CABLE TRAYS (HORIZONTAL OPEN SPACE CONFIGURATION)

RES COMMENTS

DATA IS PRESENTED ON THE EFFECTIVENESS OF SIX FIRE RETARDANT COATING MATERIALS AND BARRIER DESIGNS IN HORIZONAL OPEN SPACE CONFIGURATIONS THAT ARE IN USE OR BEING CONSIDERED FOR NUCLEAR POWER PLANTS. AN ACCEPTABLE TEST METHODOLOGY WAS DEVELOPED BY WHICH PASSIVE FIRE PROTECTION MEASURES CAN BE EVALUATED. THE TESTS DEVELOPED CAN BE PERFORMED BY SUPPLIERS AND PLANT OPERATORS TO JUSTIFY ALTERNATIVE FIRE RETARDANT COATINGS AND BARRIERS NOT LISTED BY NRC OR TO DEMONSTRATE THE EFFECTIVENESS OF THOSE MEASURES TESTED BY THE NRC IN SITUATIONS WHERE THE DESIGN BASIS FIRE IS SIGNIFICANTLY DIFFERENT THAN THE TEST CASE FIRES.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 06/12/79 ACTUAL RESP. DATE: 11/01/80 USER OFFICE REVIEWER: R. GERGUSON/E. SYLVE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS LETTER COMPARES THE EFFECTIVENESS OF COATING TRAY COVERS, AND CABLE INSULATION MATERIALS IN PREVENTING FIRE PROPAGATION IN HORIZONTAL CABLE TRAYS. SUCH CONFIGURATIONS ARE PROPOSED BY LICENSEES TO RETARD FIRE PROPAGATION. THE RIL RECOMMENDS QA REQUIREMENTS FOR MINIMUM THREE HOURS OF COATING AND FOR SOLID COVERING OF CABLE BUNDLE, I.E., NO AIR PATHS THROUGH THE BUNDLE.

*** NRR : IMPACT OF RESULTS ***

MINIMAL, ALL RESULTS WITHIN THE PERFORMANCE GOALS ASSUMED IN THE FIRE HAZARDS ANALYSIS. QUALITY ASSURANCE SHOULD BE ACCORDING TO THE LICENSEES QA PROGRAM.

*** NRR : COMMENTS AND REMARKS ***

THE TEST RESULTS HAVE LIMITED APPLICATION IN EVALUATIONS BECAUSE NO VERTICAL CONFIGURATIONS WERE TESTED, CABLES WERE DEENERGIZED, RANDOM FILLED PATTERN WAS USED, TEST CONFIGURATION WAS IN RELATIVELY OPEN AREA, AND EFFECT OF FIRE SIZES ON FIRE PROPAGATION IS NOT KNOWN. THIS PROGRAM DID NOT HAVE SPECIFIC GOALS STATED IN TERMS OF LICENSING CONCERNS.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 06/12/79 ACTUAL RESP. DATE: 07/19/79 USER OFFICE REVIEWER:

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE ENGINEERING METHODOLOGY STANDARDS BRANCH WILL USE THE RESULTS TO SUPPORT THE STAFF POSITION IN REGULATORY GUIDE 1.120 AND IN THE DEVELOPMENT OF A REGULATORY GUIDE ON FIRE STOPS.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO 79-047 DATE ISSUED: 03/19/79 RIL TITLE: A COMPUTER IMPLEMENT. OF RECENT MODELS FOR EST. DOSE EQUIV.

RESEARCH REVIEW GROUP NO.: 5-24 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B0188	DOSIMETRIC MODEL APPENDIX "I"		FOULKE J

RIL SUBJECT/DESCRIPTION

INREM II: A COMPUTER IMPLEMENTATION OF RECENT MODELS FOR ESTIMATING THE DOSE EQUIVALENT TO ORGANS OF MAN FROM AN INHALED OR INGESTED RADIONUCLIDE

RES COMMENTS

THE INREM II CODE AS CONTAINED IN NURGE/CR-0114. ALSO TRANSMITTED IS VOLUME 1 OF A TABULATION OF INTERNAL RADIAION DOSE CONVERSION FACTORS OBTAINED USING THE INREM II CODE. THIS TABULATION IS GIVEN IN "ESTIMATES OF INTERNAL DOSE EQUIVALENT TO 22 TARGET ORGANS FOR RADIONUCLIDES OCCURRING IN ROUTINE RELEASES FROM NUCLEAR FUEL-CYCLE FACILITIES," VOL. 1, NUREG/CR-0150. THE CODE COMPUTES REFERENCE ADULT HUMAN DOSE EQUIVALENTS FROM USER-SUPPLIED DOSIMETRIC AND METABOLIC INFORMATION. IN PRINCIPLE, INREM II APPROACH IS SIMILAR TO THE ONE USED IN WASH-1400. ORGAN DOSE EQUIVALENT IS COMPUTED AS THE SUM OF CONTRIBUTIONS FROM EACH SOURCE ORGAN WHERE RADIOACTIVIY IS ASSUMED PRESENT; CROSS-IRRADIATION EFFECTS CAN BE ASSESSED. DOSE CONVERSION FACTORS IN NUREG/CR-0150 AND UPCOMING VOL. 2 ARE ILLUSTRATIVE OF INREM II CODE USE ONLY. THEY ARE NOT ENDORSED FOR ADOPTION SINCE SOME OF THE METABOLIC MODELS ARE SUBJECT TO CRITICISM WITH FURTHER DEVELOPMENT OF ACCEPTABLE METABOLIC MODELS BY ORNL, THE CODE WILL PROVIDE STATE-OF-THE-ART METHODOLOGY FOR DOSE CALCULATIONS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/19/79 ACTUAL RESP. DATE: 06/13/79 USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

PRESENT ANALYSES OF RADIATION EXPOSURE SUCH AS PREPARED FOR WASH-1400, GESMO AND IN REACTOR LICENSING ACTIONS HAVE NOT BEEN UNIFORM IN DOSE ESTIMATION METHODOLOGY. THE VARIOUS APPROACHES USED FOR THE ABOVE STUDIES AND ACTIONS REFLECT VARIOUS INTERPRETATIONS OF THE STATE-OF-THE-ART IN DOSE ESTIMATION MEHODOLOGY, THE NEEDS OF PARTICULAR STUDIES AND AVAILABILITY OF DOCUMENTED MODELS. NRC DOES NOT HAVE A BROADLY APPLICABLE, DOCUMENTED, CRITICALLY REVIEWED, STATE-OF-THE-ART DOSE ESTIMATION METHODOLOGY AVAILABLE TO VARIOUS OFFICES FOR THEIR ASSESSMENT NEEDS. THE CLOSEST IS REGULATORY GUIDE 1.109, REVISION 1, 1977, WHICH REPRESENTS A CURRENTLY APPROPRIATE APPLICATION OF A REASONABLE UP-TO-DATE DOSE ASSESSMENT METHODOLOGY AS APPLICABLE TO NUCLEAR POWER PLANT EFFLUENTS. THE OFFICE OF NUCLEAR REGULATORY RESEARCH RECOGNIZED THE NEEDS IN THIS AREA, AND HAS BEEN FUNDING RESEARCH AT THE HEALTH AND SAFETY RESEARCH DIVISION OF THE OAK RIDGE NATIONAL LABORATORY (ORNL). THE RESEARCH DESCRIBED IN RIL #47 PARTIALLY FULFILLS THE NEED OF A BROADLY APPLICABLE, DOCUMENTED AND CLOSER TO THE STATE-OF-THE-ART MODEL FOR CALCULATION OF DOSES TO VARIOUS ORGANS OF A BODY FROM INTERNALLY DEPOSITED RADIONUCLIDES. HOWEVER, ITS APPLICATION TO REGULATORY PROCESSES HAS TO WAIT UNTIL SOME ADDITIONAL SUPPORTING RESEARCH IS COMPLETED (SEE COMMENTS/REMARKS) MOST OF WHICH ARE ON-GOING AT ORNL FUNDED BY RES AND SOME BENCH-MARK COMPARISONS ARE MADE.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS HAVE CONFIRMED OUR UNDERSTANDING OF INTERNAL DOSIMETRY MODELING, BUT HAVE NO DIRECT IMPACT ON LICENSING UNTIL AFTER SOME ADDITIONAL STUDY IS PERFORMED.

*** NRR : COMMENTS AND REMARKS ***

ICRP HAS AN ONGOING CONTRACT W/HEALTH & SAFETY RESEARCH DIV. OF ORNL TO DEVELOP REVISED NUCLEAR DATA, S-FACTORS, METABOLIC PARAMETERS, DOSIMETRIC MODELS, ETC. FOR USE IN ICRP'S FORTHCOMING PUBLICATION #30. IT IS NOT KNOWN THAT ORNL INTERNAL DOSIMETRY MODEL FOR ICRP IS SOMEWHAT DIFFERENT FROM THAT FOR NRC (INREM-II) ALTHOUGH BOTH MODELS ARE BASED ON ICRP'S TASK GROUP LUNG MODEL (1966, 1972) & EVE'S GI-TRACT MODEL (1966). ORNL MODEL FOR ICRP IS MORE COMPLETE IN THAT IT HAS THE BODY FLUIDS (BLOOD) REPRESENTED IN MODEL AS ADDITIONAL COMPARTMENT WHICH IS LACKING IN INREM-II. INCLUSION OF A BLOOD COMPARTMENT IS APPROPRIATE CONCEPTUALLY AS WELL AS FROM VIEW POINT OF REALISTIC MODELING; IT IS LIKELY TO REDUCE THE ORGAN DOSE CONVERSION FACTORS PARTICULARLY FOR THE SHORTER LIVED RADIONUCLIDES DUE TO DECAY DURING PARTIAL HOLD-UP IN BLOOD. BENCHMARKING INREM-II RESULTS W/ICRP'S WILL BE PRUDENT BEFORE OUR USING THEM. BEST VALUES OF METABOLIC PARAMETERS REQUIRED AS INPUTS TO RUN INREM-II ARE NOT YET AVAILABLE. NOMINAL VALUES OF PARAMETERS USED BY AUTHORS OF 2 VOLUMES (VOL. 2 IN PREPARATION) OF DOSE CONVERSION FACTOR TABULATIONS ARE FOR PURPOSES OF ILLUSTRATING USE OF INREM-II, & AUTHORS DO CAUTION AGAINST UNCRITICAL USE OF THESE TABLES IN RADIOLOGICAL APPLICATIONS BECAUSE THEY CONSIDER THESE RESULTS AS PRELIMINARY. RES SHOULD BE REQUESTED TO INCLUDE TASK OF GENERATING & PERIODICALLY UPDATING DATA LIBRARY OF BEST VALUES OF METABOLIC PARAMETERS FOR USE IN INREM-II IN THEIR CONTINUING RESEARCH PROGRAMS WITH ORNL. A SET OF VALUES OF METABOLIC PARAMETERS IS BEING USED IN ICRP WORK AT ORNL. ICRP VALUES ARE NOT YET AVAILABLE TO USE, BUT WHEN AVAIL, IT WILL BE PRUDENT TO COMPARE VALUES W/PRELIMINARY VALUES USED BY ORNL FOR NRC, & MAKE APPROPRIATE REVISION IF NECESSARY. NUCLEAR DATA DEVELOPED & UTILIZED BY ORNL FOR NRC NOT NECESSARILY SAME AS BEING DEVELOPED FOR ICRP. THOUGH SUBSTANTIAL DIFFERENCES NOT ANTICIPATED IN AREA, IT WILL BE PRUDENT TO COMPARE DATA ALSO.

[illegible]

RIL NO: 79-048 DATE ISSUED: 04/03/79 RIL TITLE: A TECTONIC OVERVIEW OF THE CENTRAL MIDCONTINENT

RESEARCH REVIEW GROUP NO.: 3-02 0-00 SPONSORING OFFICE(S): SD, NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

A TECTONIC OVERVIEW OF THE CENTRAL MIDCONTINENT

RES COMMENTS

"A TECTONIC OVERVIEW OF THE CENTRAL MIDCONTINENT", NUREG-0382, IS THE MOST UP-TO-DATE SYNTHESIS OF GEOLOGIC KNOWLEDGE OF THE EARTHS CRUST IN THE STUDY AREA IT CONTAINS THE MOST COMPLETE BIBLIOGRAPHY OF THE GEODYNAMICS OF THE AREA AND WILL AID IN NUCLEAR POWER PLANT LICENSING. IT IS RECOMMENDED THAT THE INFORMATION AND HYPOTHESES BE USED AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 08/03/79 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER:

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

NO COMMENT AT THIS TIME DUE TO PRELIMINARY NATURE OF THE WORK. WE PLAN AN EXTENSIVE REVIEW WHEN THE PROJECT IS FURTHER ALONG.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-049 **DATE ISSUED**: 04/04/79 **RIL TITLE**: IN VITRO DISSOLUTION ON URANIUM PRODUCT SAMPLES

RESEARCH REVIEW GROUP NO.: 5-23 0-00 **SPONSORING OFFICE(S)**: SD

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A1222	BIOL CHAR RAD EXP & DOSE ESTIMATES		FOULKE J

RIL SUBJECT/DESCRIPTION

IN VITRO DISSOLUTION OF URANIUM PRODUCT SAMPLES FROM FOUR URANIUM MILLS

RES COMMENTS

THE MEASUREMENT OF THE SOLUBILITY OF VARIOUS FORMS OF YELLOWCAKE IN VITRO UTILIZED TWO SOLVENT SYSTEMS: A SIMULANT OF AN ULTRAFILTRATE OF BLOOD SERUM AND 0.1M HCL. THE RESULTS OF THIS STUDY WILL BE USED TO DETERMINE WHETHER YELLOWCAKE SHOULD BE CONSIDERED A SOLUBLE COMPOUND WITH RESPECT TO 10 CFR 20. THE DATA OBTAINED USING THE SERUM SIMULANT SHOW THAT 25 TO 64 PERCENT OF ALL SAMPLES TESTED DISSOLVED WITH HALF-TIMES LESS THAN 16 HOURS. IDEALLY, SOLUBILITY CLASSIFICATIONS SHOULD BE BASED ON THE DISSOLUTION HALF-TIMES OF THE PARTICULAR PRODUCT UNDER CONSIDERATION. THE DATA INDICATE THAT YELLOWCAKE SHOULD BE TREATED AS A CLASS D COMPOUND FOR THE PURPOSE OF EXPOSURE CONTROL.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 08/04/79 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: S. MCGUIRE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE RESULTS OF THIS RESEARCH WILL BE USED IN FINALIZING REGULATORY GUIDE 8.22, "BIOASSAY AT URANIUM MILLS." NO FURTHER RESEARCH ON THIS TOPIC IS PRESENTLY CONTEMPLATED.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-050 DATE ISSUED: 04/06/79 RIL TITLE: CRITICALITY SAFETY GUIDANCE

RESEARCH REVIEW GROUP NO.: 5-07 0-00 SPONSORING OFFICE(S): NMSS (77-9)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

CRITICALITY SAFETY GUIDANCE

RES COMMENTS

SINCE 1957, THE NUCLEAR SAFETY GUIDE HAS PROVIDED USERS OF FISSIONABLE MATERIAL WITH SIMPLE METHODS TO ASSURE SYSTEM SUBCRITICALITY. RESEARCH INFORMATION LETTER #50 TRANSMITS NUREG/CR-0095, "NUCLEAR SAFETY GUIDE, TID-7016, REVISION 2." THIS REVISION UTILIZES IMPROVED CRITICALITY DATA AND COMPUTATIONAL TECHNIQUES NOT AVAILABLE IN THE PREVIOUS GUIDE ISSUED IN 1961. REVISION 2 SHOULD BE REGARDED AS A SUPPLEMENT TO PREVIOUS GUIDES SINCE IT DOES NOT HAVE INTENTIONAL CONSERVATISMS INCLUDED AS IN PREVIOUS GUIDES. IN USING REVISION 2 OF THE GUIDE, THE USER MUST IMPOSE APPROPRIATE SAFETY FACTORS FOR HIS APPLICATION AND THE NRC STAFF MUST DETERMINE THAT THE SAFETY MARGINS PROPOSED BY THE USER OF REVISION 2 ARE ADEQUATE.

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 08/06/79 ACTUAL RESP. DATE: 03/03/80 USER OFFICE REVIEWER: R. STEVENSON

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

THE REVISED NUCLEAR SAFETY GUIDE IS QUOTED TO THE LICENSEES WHENEVER THEIR AMENDMENT OR RENEWAL OF APPLICATIONS REFER TO THE 1961 VERSION OF THE GUIDE AND FAIL TO RECOGNIZE NEW DEVELOPMENTS IN NEUTRON INTERACTION-ACTION, CERTAIN OF WHICH ARE SUMMARIZED IN THE UPDATED GUIDE. THESE NEW DEVELOPMENTS, SOME OF WHICH HAVE RESULTED FROM NRC-SPONSORED RESEARCH, HAVE RENDERED QUESTIONABLE CERTAIN PAST PROCEDURES IN THE ANALYSES OF NEUTRON INTERACTION.

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-051 DATE ISSUED: 04/12/79 RIL TITLE: THE CONCEPT COMPUTER CODE AND CAPITAL COSTS FOR PWR PLANTS

RESEARCH REVIEW GROUP NO.: 5-21 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THE CONCEPT COMPUTER CODE AND CAPITAL COSTS FOR PRESSURIZED WATER REACTOR PLANTS

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH UPDATING AND EXPANDING THE CONCEPT COMPUTER CODE FOR FORECASTING CAPITAL COSTS OF PRESSURIZED WATER REACTOR PLANTS. IN 1971 THE ATOMIC ENERGY COMMISSION AUTHORIZED POWER PLANT INVESTMENT COST STUDIES, WHICH CULMINATED IN THE WASH-1230 REPORTS PUBLISHED IN 1972. THEIR PURPOSE WAS TO FACILITATE POLICY AND ECONOMIC DECISIONS ABOUT ELECTRIC GENERATION FACILITIES IN THE PUBLIC AND PRIVATE SECTORS. NATIONAL PRIORITIES ON ENERGY, THE REGULATORY ENVIRONMENT AND THE COST OF LABOR, EQUIPMENT AND MATERIAL HAVE CHANGED SIGNIFICANTLY. THESE CHANGES DICTATED THE NECESSITY OF UPDATING THIS SERIES OF STUDIES, AND EXPANDING THE SCOPE TO CONSIDER THE FUEL CYCLE AND THE TOTAL GENERATING COST. AS A RESULT, A PROGRAM TO STUDY, REASSESS AND PRODUCE A NEW SET OF UPDATED REPORTS WAS AUTHORIZED AND UNDERTAKEN.

THE STUDIES IN THESE SERIES HAVE A UNIFORM SET OF ECONOMIC AND TECHNICAL CRITERIA AND A UNIFORM ACCOUNTING SYSTEM. THE INVESTMENT COST ESTIMATES IN THESE SERIES ARE DEVELOPED FOR REFERENCE PLANTS CONSTRUCTED AT A HYPOTHETICAL SITE. THE ESTIMATED TOTAL BASE CONSTRUCTION COST FOR THE 1139 MWE PWR REFERENCE DESIGN IS $568,831,011 OR $449/KW BASED ON JULY 1, 1976 PRICES. THE TOTAL BASE CONSTRUCTION COST FOR THE PWR POWER PLANT (1031 MWE NET OUTPUT) REFERENCE IN WASH-1230 WAS APPROXIMATELY $211,000,000 OR $250/KW, BASED UPON PRICES EFFECTIVE JANUARY 1971. THUS, THE 1977 STUDY INDICATES APPROXIMATELY A 143 PERCENT INCREASE IN THE COST OF THE PLANT IN TERMS OF $/KW. THE TOTAL DIRECT CRAFT LABOR COST OF APPROXIMATELY $133,100,000 CORRESPONDS TO AN AVERAGE HOURLY RATE OF $12.30. APPROXIMATELY 10,820,000 CRAFT LABOR MANHOURS AVERAGE ABOUT 9.5 MANHOURS/KW. THESE COMPARE TO AVERAGES OF $8.86/HOUR AND 6.0 MANHOURS/KW RESPECTIVELY FOR THE EARLIER DESIGN REPORT IN WASH-1230.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/12/79 ACTUAL RESP. DATE: 07/12/79 USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PRINCIPAL APPLICATION OF THE INVESTMENT COST DATA IS TO UPDATE THE CONCEPT COMPUTER CODE. IN TURN THE CONCEPT CODE IS USED TO ESTIMATE CAPITAL COST FOR DIFFERENT SIZE PLANTS, DIFFERENT REGIONS OF THE COUNTY, DIFFERENT SCHEDULE LENGTH, DIFFERENT COMPLETION DATES, DIFFERENT ESCALATION AND INTEREST RATES. IN ADDITION TO UPDATING CONCEPT THE DATA IS USED AS A GENERAL REFERENCE FOR SUCH THINGS AS, COST OF COMPONENTS, QUANTITIES OF MATERIALS USED, TYPE AND QUANTITY OF LABOR, ETC.

*** NRR : IMPACT OF RESULTS ***

DURING FY 1977 44 REQUESTS WERE MADE FOR CONCEPT CODE RUNS AND 32 REQUESTS WERE MADE IN 1978. MOST REQUESTS INVOLVED RUNS FOR SEVERAL SIZES OF COAL PLANTS AND ONE OR TWO NUCLEAR UNITS FOR DIFFERENT ESCALATION AND INTEREST RATES. THE USE OF THE CONCEPT CODE PERMITTED THE STAFF TO PERFORM THESE ANALYSES MORE EFFICIENTLY AND QUICKLY THAN IF THE CONCEPT CODE WERE NOT AVAILABLE.

*** NRR : COMMENTS AND REMARKS ***

DOE IS FUNDING THE LATEST UPDATE.

RIL NO: 79-052 **DATE ISSUED**: 04/23/79 **RIL TITLE**: EARTHQUAKE INTENSITY SCALE

RESEARCH REVIEW GROUP NO.: 3-02 0-00 **SPONSORING OFFICE(S)**: SD, NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

EARTHQUAKE INTENSITY SCALE

RES COMMENTS

THIS MEMORANDUM TRANSMITS THE RESULTS OF COMPLETED RESEARCH ON THE SYSTEMATIC EVALUATION OF THE MACROSEISMIC DATA FILE COMPILED FOR OVER HALF A CENTURY BY THE U.S. COAST AND GEODETIC SURVEY AND ITS SUCCESSOR ORGANIZATIONS. A NEW SEISMIC INTENSITY SCALE WAS FORMED BY REVISION OF THE MODIFIED MERCALLI INTENSITY SCALE OF 1931. THE RESULTS HAVE BEEN PUBLISHED AS NOAA TECHNICAL MEMORANDUM, EDS NGSDC 4, "REEVALUATION OF THE MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES, USING DISTANCE AS A DETERMINANT." THE PURPOSE OF THE STUDY WAS TO RELATE EARTHQUAKE INTENSITY TO THE ENERGY RELEASED AND ITS ATTENUATION WITH DISTANCE TO PROVIDE A UNIFORM SCALE RELATED MORE LOGICALLY TO THE PHYSICAL PARAMETERS OF ACCELERATION, VELOCITY, DISPLACEMENT AND SPECTRAL CONTENT. IT IS SUGGESTED THAT NRC MAKE A FORMAL RECOMMENDATION TO THE U.S.G.S. THAT A NEW INTENSITY SCALE BASED ON THIS OR A SIMILAR ANALYSIS BE PROMULGATED AS AN OFFICIAL STANDARD. THE NEW SCALE SHOULD PERMIT A TRANSITION FROM THE MM INTENSITY SCALE AND MAKE FULL USE OF THE EXTENSIVE DATA BASE ALREADY AVAILABLE.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 08/23/79 ACTUAL RESP. DATE: 11/28/79 USER OFFICE REVIEWER: R. JACKSON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

NONE AT THIS TIME; 100 PREMATURE.

*** NRR : IMPACT OF RESULTS ***

NONE AT THIS TIME.

*** NRR : COMMENTS AND REMARKS ***

THIS INFORMATION IS IMPORTANT FOR THE EVALUATION OF EARTHQUAKE INTENSITIES AND SHOULD BE FORWARDED TO THE USGS FOR CONSIDERATION IN ANY REEVALUATION OF THE INTENSITY SCALES.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 08/23/79 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER:

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

NO RESPONSE RECEIVED.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-053 DATE ISSUED: 05/16/79 RIL TITLE: DEBRIS-BED COOLABILITY LIMITS

RESEARCH REVIEW GROUP NO.: 2-06 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A1181	CORE DEBRIS BEHAVIOR		WRIGHT R

RIL SUBJECT/DESCRIPTION

DEBRIS-BED COOLABILITY LIMITS, RESULTS FROM IN-CORE TESTS D-1, D-2 AND D-3

RES COMMENTS

THIS RIL REPORTS RESULTS OF THE INITIAL THREE EXPERIMENTS IN THE ACPR TEST REACTOR ON THE COOLABILITY LIMITS OF BEDS OF PARTICULATE FUEL DEBRIS UNDER A POOL OF SODIUM. A MODEL DESCRIBING THIS BEHAVIOR IS ALSO REPORTED. THIS WORK SUPPLIES KEY INFORMATION FOR THE ASSESSMENT OF THE RISK OF A CORE-MELT ACCIDENT IN A LMFBR. IN THE EXPERIMENTS THE SPECIFIC BED POWER WAS MEASURED AT WHICH LOCAL DRYOUT OF THE SODIUM COOLANT OCCURRED IN THE BED. LOCAL DRYOUT HAD BEEN THOUGHT TO BE THE COOLABILITY LIMIT OF A CORE DEBRIS BED, AN ASSUMPTION THAT HAS BEEN USED IN SAFETY EVALUATIONS. BY SUSTAINED OPERATION AT POWER UNDER CONDITIONS OF LOCAL DRYOUT OF THE SODIUM IN THE BED, THESE EXPERIMENTS SHOWED THAT LOCAL DRYOUT IS NOT THE TRUE BED COOLABILITY LIMIT.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/16/79 ACTUAL RESP. DATE: 11/09/79 USER OFFICE REVIEWER: J. MEYER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SINCE THERE IS NO LMFBR LICENSING ACTIVITY AT THE PRESENT TIME, THERE IS NO IMMEDIATE APPLICATION OF THESE EXPERIMENTAL RESULTS TO THE REGULATORY PROCESS. HOWEVER, IF THE LMFBR LICENSING AGAIN BECOMES ACTIVE, THIS PROGRAM HAS APPLICATION TO POST ACCIDENT HEAT REMOVAL FOLLOWING A CORE DISRUPTION ACCIDENT, IN PARTICULAR TO AN ASSESSMENT WHETHER A DEBRIS-BED IS COOLABLE IN PLACE.

*** NRR : IMPACT OF RESULTS ***

PRESENT IMPACT IS MINIMAL BECAUSE OF LACK OF LMFBR LICENSING ACTIVITY. HOWEVER, IN A GENERIC SENSE, THE RESULTS ARE IMPORTANT. THEY SUGGEST MORE HEAT CAN BE REMOVED FROM DEBRIS BEDS THAN PREVIOUSLY THOUGHT. LOCAL DRYOUT IS NOT NECESSARILY LIMITING. THESE ARE THE FIRST EXPERIMENTS EMPLOYING FISSION HEATING IN DEBRIS BEDS. PAST EXPERIMENTS HAD TO SIMULATE FISSION HEATING AND WERE NON PROTOTYPIC.

*** NRR : COMMENTS AND REMARKS ***

THE GOALS OF THE FUTURE WORK ARE WORTH WHILE BUT MAY BE BETTER ACHIEVED WITH A SERIES OF SMALL STUDIES USING SIMULANTS. THE PURPOSE SHOULD BE TO UNDERSTAND THE PHYSICAL PROCESSES FROM WELL INSTRUMENTED EX-VESSEL EXPERIMENTS. THE MORE COMPLEX IN-CORE EXPERIMENTS SHOULD BE FOR CONFIRMATION; THE INITIAL TESTS MAY HAVE ALREADY ACHIEVED THIS GOAL. ATTEMPTING TO GAIN DETAILED INFORMATION FROM IN-PILE EXPERIMENTS MAY NOT BE COST EFFECTIVE.

RIL NO: 79-054 **DATE ISSUED**: 05/15/79 **RIL TITLE**: THE SET EQUATION TRANSFORMATION SYSTEM

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR, NMSS

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THE SET EQUATION TRANSFORMATION SYSTEM

RES COMMENTS

AS A RESULT OF THE WORK PERFORMED IN THE SETS COMPUTER CODE PROJECT, AN IMPROVED VERSION OF THE SETS CODE HAS BEEN DOCUMENTED AND MADE AVAILABLE FOR USE BY NRC CONTRACTORS AND PERSONNEL FOR PROJECTS REQUIRING AN EFFICIENT TOOL FOR THE ANALYSIS OF COMPLEX SYSTEMS.

THE MAJOR RESULTS OF THE SETS PROGRAM HAVE BEEN:

(1) DEVELOPMENT OF AN AUTOMATIC TREE DECOMPOSITION ALGORITHM WHICH IS CURRENTLY BEING INCORPORATED INTO THE STANDARD VERSION OF SETS;
(2) DEVELOPMENT, IN PRELIMINARY FORM, OF BASIC MINIMAL CUT SET QUANTIFICATION PROCEDURES;
(3) DEVELOPMENT OF A STANDARDIZED VERSION OF THE SETS CODE FOR THE CDC 6600 COMPUTER, AND INSTALLATION OF THIS VERSION OF THE CODE AT THE BROOKHAVEN NATIONAL LABORATORY COMPUTER CENTER FOR USE BY NRC PERSONNEL; AND
(4) PREPARATION OF A SETS USERS' MANUAL ORIENTED SPECIFICALLY FOR THE FAULT TREE ANALYST.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/15/79 ACTUAL RESP. DATE: 07/27/79 USER OFFICE REVIEWER: S. HANAUER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE IMPROVED VERSION OF THE SET EQUATION TRANSFORMATION SYSTEM (SETS) IS A COMPUTER CODE FOR EVALUATING LARGE FAULT TREES. THERE ARE CURRENTLY TWO ACTIVITIES WITHIN NRR THAT USE FAULT TREES AS AN ANALYSIS METHOD. THESE TWO ACTIVITIES ARE GENERAL TASK NO. A-17 AND THE VITAL AREA ANALYSIS. THE SETS CODE PROVIDES THE NRC STAFF WITH THE CAPABILITY TO INDEPENDENTLY AUDIT THE RESULTS OF ANALYSES THAT ARE BASED ON FAULT TREES, ALTHOUGH IN THE CASE OF TASK NO. A-17, THE CONTRACTOR WHO DEVELOPS THE FAULT TREE ALSO USES SETS CODE TO ANALYZE THE FAULT TREE. THE AVAILABILITY OF THE SETS CODE ALSO PROVIDES A TOOL FOR FUTURE USE BY THE NRC STAFF IN APPLYING FAULT TREE METHODS TO THE LICENSING PROCESS.

THE SETS CODE IS AN IMPORTANT FEATURE IN THE METHODOLOGY (COMPUTER CODE) USED TO IDENTIFY TYPE I VITAL AREAS (I.E., "....THOSE AREAS WHEREIN SUCCESSFUL SABOTAGE CAN BE ACCOMPLISHED BY COMPROMISING OR DESTROYING THE VITAL SYSTEMS OR COMPONENTS LOCATED WITHIN AN AREA).

TYPE I VITAL AREAS ARE THE MOST SENSITIVE SECURITY AREAS IN THE PLANT AND REQUIRE THE HIGHEST LEVELS OF PHYSICAL PROTECTION. IDENTIFYING THESE AREAS IS AN IMPORTANT CONSIDERATION IN THE STAFF'S EVALUATION OF PHYSICAL SECURITY AT A NUCLEAR POWER PLANT. THIS ANALYSIS AND EVALUATION IS CURRENTLY BEING USED FOR ALL OPERATING PLANT REVIEWS AND WILL ALSO BE AN ONGOING REQUIREMENT IN OPERATING LICENSE REVIEWS.

*** NRR : IMPACT OF RESULTS ***

THE SETS CODE HAS NO DIRECT IMPACT ON THE LICENSING PROCESS BUT IN THE FUTURE IT WILL PERMIT THE NRC STAFF TO ANALYZE LARGE SYSTEMS THAT MIGHT OTHERWISE HAVE TO BE ANALYZED BY LESS EFFICIENT OR LESS EFFECTIVE METHODS.

THE RESULTS OF THE MORE EFFECTIVE AND EFFICIENCY COULD LEAD TO EITHER A RELAXATION OF EXISTING REQUIREMENTS OR COULD LEAD TO NEW REQUIREMENTS OR A TIGHTENING OF AN EXISTING REQUIREMENT.

*** NRR : COMMENTS AND REMARKS ***

THE SETS CODE IS ONE OF SEVERAL COMPUTER CODES THAT CAN BE USED TO EVALUATE FAULT TREES, INCLUDING EVALUATION FOR COMMON CAUSE FAILURES. NO ATTEMPT HAS BEEN MADE HERE TO DETERMINE THE RELATIVE EFFECTIVENESS OR EASE OF USING THESE VARIOUS CODES.

RIL NO: 79-055 DATE ISSUED: 05/29/79 RIL TITLE: CONCEPT COMPUTER CODE & CAPITAL COST/SULFUR COAL PLANTS

RESEARCH REVIEW GROUP NO.: 5-21 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THE CONCEPT COMPUTER CODE AND CAPITAL COST FOR HIGH AND LOW SULFUR COAL PLANTS - 1200 MWE

RES COMMENTS

THIS MEMORANDUM TRANSMITS THE RESULTS OF COMPLETED RESEARCH UPDATING AND EXPANDING THE CONCEPT COMPUTER CODE FOR FORECASTING CAPITAL COSTS OF HIGH AND LOW SULFUR COAL PLANTS - 1200 MWE. THE ESTIMATED TOTAL BASE CONSTRUCTION COST FOR THE 1200 MWE (NOMINAL) HIGH SULFUR COAL PLANT REFERENCE DESIGN IS $465,498,393 OR $378/KW BASED ON JULY 1, 1976 PRICES. THE ESITMATED TOTAL BASE CONSTRUCTION COST FOR THE 1200 MWE (NOMINAL) LOW SULFUR COAL PLANT REFERENCE DESIGN IS $402,825,229 OR $324/KW BASED ON JULY 1, 1976 PRICES. THE TOTAL BASE CONSTRUCTION COST FOR THE COAL-FIRED POWER PLANT (1000 MWE NET OUTPUT) REFERENCE IS WASH-1230 WHICH DID NOT HAVE FLUE GAS DESULFURIZATION IS APPROXIMATELY $174,000,000 OR $174/KW, BASED UPON PRICES EFFECTIVE JANUARY 1971. THUS, THIS 1977 STUDY INDICATES APPROXIMATELY A 87.9 PERCENT INCREASE IN THE COST OF THE PLANT IN TERMS OF $/KW. THE STUDY AND ITS METHODOLOGIES HAVE BEEN REVIEWED EXTENSIVELY WHILE IN PROGRESS BY THE RES PROJECT MANAGER AND VARIOUS STAFF MEMBERS FROM NRR. RES RECOMMENDS THAT THE UPDATED METHODOLOGY BE USED BY NRR FOR APPLICATION TO THE IDENTIFIED REGULATORY NEED (RR-NRR-76-6).

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/29/79 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PRINCIPAL APPLICATION OF THE INVESTMENT COST DATA IS TO UPDATE THE CONCEPT COMPUTER CODE. IN TURN THE CONCEPT CODE IS USED TO ESTIMATE CAPITAL COST FOR DIFFERENT SIZE PLANTS, DIFFERENT REGIONS OF THE COUNTY, DIFFERENT SCHEDULE LENGTH, DIFFERENT COMPLETION DATES, DIFFERENT ESCALATION AND INTEREST RATES. IN ADDITION TO UPDATING CONCEPT THE DATA IS USED AS A GENERAL REFERENCE FOR SUCH THINGS AS, COST OF COMPONENTS, QUANTITIES OF MATERIALS USED, TYPE AND QUANTITY OF LABOR, ETC.

*** NRR : IMPACT OF RESULTS ***

DURING FY 1977 44 REQUESTS WERE MADE FOR CONCEPT CODE RUNS AND 32 REQUESTS WERE MADE IN 1978. MOST REQUES , INVOLVED RUNS FOR SEVERAL SIZES OF COAL PLANTS AND ONE OR TWO NUCLEAR UNITS FOR DIFFERENT ESCALATION AND INTEREST RATES. T USE OF THE CONCEPT PERMITTED THE STAFF TO PERFORM THESE ANALYSIS MORE EFFICIENTLY AND QUICKLY THAN IF THE CONCEPT CODE WERE AVAILABLE.

*** NRR : COMMENTS AND REMARKS ***

DOE IS FUNDING THE LATEST UPDATE.

RIL NO: 79-056   DATE ISSUED: 07/25/79   RIL TITLE: EFFECTS OF NUCLEAR POWER PLANTS ON COMMUNITY GROWTH

RESEARCH REVIEW GROUP NO.: 5-21 0-00   SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

EFFECTS OF NUCLEAR POWER PLANTS ON COMMUNITY GROWTH AND RESIDENTIAL PROPERTY VALUES

RES COMMENTS

AS PART OF A LONGER TERM REAEARCH PROJECT TO DEVELOP FORECASTING METHODS FOR ESTIMATING THE IMPACT OF NUCLEAR POWER STATIONS ON LAND VALUES AND COMMUNITY GROWTH, THE PENNSYLVANIA STATE UNIVERSITY INSTITUTE FOR LAND AND WATER RESOURCES CARRIED OUT A STUDY OF THE EFFECTS OF NUCLEAR POWER STATIONS ON LAND VALUES AND COMMUNITY GROWTH AT FOUR PREVIOUSLY-LICENSED STATIONS IN THE NORTHEAST. THE RESULTS OF THE STUDY DID NOT INDICATE THE PRESENCE OF SIGNIFICANT ADVERSE EFFECTS ON LAND VALUES OR COMMUNITY GROWTH.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 11/25/79 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER: W. RUSSELL

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

AS PART OF THE COST BENEFIT ANALYSIS OF LICENSING APPLICATIONS, THE NRC IS REQUIRED TO ASSESS THE LIKELY SOCIOECONOMIC IMPACTS ASSOCIATED WITH CONSTRUCTION AND OPERATION OF NUCLEAR POWER STATIONS ON LOCAL COMMUNITIES AND THE SURROUNDING REGIONS. THE IMPACT OF OPERATING STATIONS ON LAND USE, PROPERTY VALUES, LAND USE PLANNING AND POPULATION CHANGE ARE EFFECTS WHICH HAVE RECEIVED CONSIDERABLE ATTENTION FROM INTERVENORS AND HEARING BOARDS. THIS RESEARCH CONTRACT WAS INITIATED WITH THE INTENTION OF TESTING A METHODOLOGY FOR QUANTIFYING THE IMPACT OF STATION SITING ON RESIDENTIAL PROPERTY VALUES.

*** NRR : IMPACT OF RESULTS ***

BECAUSE OF THE NON-RANDOM SELECTION OF THE STUDY SITE, GENERALIZABLE CONCLUSIONS CANNOT BE DRAWN; HOWEVER, FOR THE 4 SITES INVOLVED THE RESULTS DO INDICATE THAT THE NUCLEAR STATIONS HAD NO MEASURABLE, ADVERSE IMPACT ON RESIDENTIAL VALUES IN SURROUNDING AREAS. BESIDES ADDING TO THE STAFF'S GENERAL KNOWLEDGE, THE STUDY PROVIDED THE STAFF WITH A TESTED, OBJECTIVE, AND REPLICABLE METHODOLOGY FOR RETROSPECTIVELY DIMENSIONING PROPERTY VALUE IMPACTS AT NUCLEAR STATIONS. WITH RESPECT TO THIS POINT, THE STAFF INTENDS TO EVALUATE THE IMPACT OF THE ACCIDENT AT THREE MILE ISLAND ON PROPERTY VALUES USING A METHODOLOGY BASED ON THE PROCEDURE USED IN THE CONTRACT.

THE METHODOLOGY AND CONCLUSIONS OF THIS RESEARCH INCREASED THE STAFF'S UNDERSTANDING OF THE PROCESS OF PROPERTY VALUE IMPACT AT THE LOCAL LEVEL. CONTINUATION OF RESEARCH ON PROPERTY VALUE IMPACTS SHOULD RESULT IN GENERALLY RELIABLE METHODS FOR PREDICTING RESIDENTIAL VALUE IMPACTS IN SPECIFIC SITING CASES.

*** NRR : COMMENTS AND REMARKS ***

NONE

RIL NO: 79-057 **DATE ISSUED**: 08/10/79 **RIL TITLE**: SMALL SCALE ECC BYPASS RESEARCH RESULTS

RESEARCH REVIEW GROUP NO.: 1-06 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

SMALL SCALE ECC BYPASS RESEARCH RESULTS

RES COMMENTS

ANALYTICAL AND EXPERIMENTAL STUDIES OF STEAM-WATER MIXING EFFECTS ON THE PENETRATION OF COOLING WATER IN SMALL MODELS OF PWR VESSELS HAVE BEEN CONDUCTED OVER THE PAST FIVE YEARS AT BATTELLE COLUMBUS LABORATORIES AND CREARE, INC. FISCAL YEAR 1979 MARKED THE COMPLETION OF THE BULK OF THIS WORK AND A RESEARCH INFORMATION LETTER SUMMARIZING THE FINDINGS WAS PREPARED. THE PHENOMENA INFLUENCING COOLING WATER PENETRATION IN THE SMALL 1/15 AND 2/15 SCALE MODELS IS WELL UNDERSTOOD AND A TRANSIENT MODEL DESCRIBING COOLING WATER PENETRATION IN THESE SMALL SCALE TESTS HAVE BEEN DEVELOPED. SENSITIVITY STUDIES OF THE MODEL UNCERTAINTY (PRIMARY SCALING) WHEN USED TO CALCULATE COOLING WATER PENETRATION IN A PWR HAVE BEEN PERFORMED AND COMPARISONS MADE WITH LOFT DATA. THE SMALL SCALE TESTS SUPPORT THE NEED FOR ADDITIONAL TESTS AT LARGER SCALE, BUT PROVIDE EVIDENCE OF THE CONSERVATISM IN THE MODELS USED IN THE LICENSING PROCESS.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 79-058 DATE ISSUED: 08/29/79 RIL TITLE: COMPAR. OF SIMUL. MODELS USED IN ASSESNG. PWR. PLNT. INDUCED

RESEARCH REVIEW GROUP NO.: 5-15 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

COMPARISON OF SIMULATION MODELS USED IN ASSESSING THE EFFECTS OF POWER PLANT INDUCED MORTALITY OF FISH POPULATIONS

RES COMMENTS

THIS RESEARCH EVALUATED THE EXISTING MATHEMATICAL MODELS FOR PREDICTING THE IMPACT OF NUCLEAR POWER PLANT OPERATION ON ECONOMICALLY IMPORTANT FISH SPECIES. THE MATHEMATICAL STATEMENTS, THE EQUATIONS, AND UNDERLYING ASSUMPTIONS USED FOR ASSESSING POWER PLANT INDUCED FISH MORTALITY WERE COMPARED. VALUES OF PARAMETERS AND THE TECHNICAL DATA SOURCES USED TO OBTAIN THEM WERE INVESTIGATED. BECAUSE MANY OF THE MODELS HAD DIFFERENT BASIC ASSUMPTIONS, PARAMETRIC VALUES, OR BOTH, AN INTERACTIVE LIFE-CYCLE MODEL SIMULATOR WAS DEVELOPED TO COMPARE THE PREDICTIONS OF THE VARIOUS MODELS. IT WAS DETERMINED THAT NO PRESENTLY EXISTING MODEL CAN BE USED TO MAKE QUANTITATIVE IMPACT PREDICTIONS.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 79-059   DATE ISSUED: 09/21/79   RIL TITLE: TRANSIENT FUEL ROD BEHAVIOR CODE: FRAP-T4

RESEARCH REVIEW GROUP NO.: 1-12 0-00   SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #   PROJECT TITLE   RES UNIT   RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

TRANSIENT FUEL ROD BEHAVIOR CODE: FRAP-T4

RES COMMENTS

FRAP-T4 IS A BEST-ESTIMATE COMPUTER CODE THAT CALCULATES THE THERMAL AND MECHANICAL RESPONSE OF A NUCLEAR FUEL ROD DURING NORMAL, OFF-NORMAL, AND TRANSIENT CONDITIONS. THE CODE NOW HAS THE CAPABILITY TO BE USED IN THE ANALYSIS OF THE ENTIRE SEQUENCE OF A LOCA THAT WENT THROUGH REFLOOD. THE CODE HAS BEEN USED TO ANALYZE SUCH EVENTS FOR THE POWER BURST FACILITY TEST PROGRAM AND THE LOSS-OF-COOLANT FLUID TEST PROGRAM AT THE IDAHO NATIONAL ENGINEERING LABORATORY. IT HAS ALSO BEEN USED TO STUDY OTHER TRANSIENT EVENTS SUCH AS REACTIVITY-INITIATED ACCIDENTS, POWER-COOLING MISMATCH EVENTS, AND ANTICIPATED TRANSIENTS WITHOUT SCRAM. THE REPORT SUMMARIZED THE CODE'S PERFORMANCE IN THE ABOVE AREAS VIA DATA COMPARISONS, CONTAINS A SUMMARY TABLE WHICH SHOWS THE STANDARD ERROR BETWEEN DATA AND CALCULATED RESULTS, AND CONCLUDES WITH A SECTION ON USER RECOMMENDATIONS BASED ON THE CODE ASSESSMENT RESULTS.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 79-060 **DATE ISSUED**: 10/12/79 **RIL TITLE**: SEISMICITY AND TECTONIC RELAT. OF THE NEMAHA UPLIFT IN OK.

RESEARCH REVIEW GROUP NO.: 3-02 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

SEISMICITY AND TECTONIC RELATIONSHIPS OF THE NEMAHA UPLIFT IN OKLAHOMA

RES COMMENTS

GEOLOGIC AND SEISMOLOGIC INVESTIGATIONS OF THE NEMAHA UPLIFT BEGAN ON OCTOBER 1, 1976. THE GEOLOGICAL STUDIES HAVE FOCUSED, THUS FAR, ON THE CONSTRUCTION OF A SERIES OF STRUCTURE-CONTOUR MAPS ON KEY STRATIGRAPHIC HORIZONS: THE TOP OF THE ORDOVICIAN VIOLA FORMATION, THE BASE OF THE PENNSYLVANIAN, AND THE TOP OF THE OSWEGO FORMATION. THE CONTOUR-MAPPING PHASE OF THE PROGRAM IS APPROXIMATELY TWO THIRDS COMPLETED. THE INITIAL MAPPING PROGRAM REVEALS A COMPLEX FAULT PATTERN AND GEOLOGIC HISTORY OF THE NEMAHA RIDGE. IT APPEARS THAT THE UPLIFT AND ASSOCIATED FAULTS BEGAN IN EARLY PENNSYLVANIAN TIME AND THAT TECTONIC ACTIVITY CEASED IN MIDDLE PENNSYLVANIA TIME, AT LEAST IN CENTRAL OKLAHOMA.

A DISCUSSION OF BASEMENT ROCKS IN CENTRAL OKLAHOMA IS INCLUDED WITHIN THIS REPORT. THE SEISMOLOGICAL STUDIES HAVE CONCENTRATED ON THE INSTALLATION OF EIGHT SEISMOMETERS IN SUCH A WAY AS TO INCLUDE DETAILED COVERAGE OF THE ENTIRE RIDGE IN OKLAHOMA AS WELL AS MOST OF THE REMAINING AREAS OF OKLAHOMA.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 02/12/80 ACTUAL RESP. DATE: 11/09/79 USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

IT IS RECOMMENDED THAT THE INFORMATION CONTAINED IN NUREG/CR-0050 BE CONSIDERED BY THE OFFICE OF NUCLEAR REACTOR REGULATION AS INPUT INFORMATION TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

*** NRR : IMPACT OF RESULTS ***

THE AVAILABILITY OF THE RESEARCH HAS BROADENED OUR DATA BASE FOR THIS REGION BUT CURRENTLY HAS NO DIRECT IMPACT ON OUR LICENSING ACTIVITIES. THE GEOLOGIC AND SEISMIC DATA BASE AVAILABLE IN THIS REPORT IS INSUFFICIENT TO COMPLETELY EVALUATE THE AREA EXCEPT ON A PRELIMINARY BASIS. A SEISMOTECTONIC MODEL FOR THE NEMAHA UPLIFT IN OKLAHOMA MUST ALSO BE BASED IN PART ON CONCEPTS DEVELOPED FROM RESULTS OF THE STUDIES AND MUST CONSIDER VERTICAL AND LATERAL VARIATIONS IN COMPOSITION AND PHYSICAL PROPERTIES OF THE NEMAHA UPLIFT.

*** NRR : COMMENTS AND REMARKS ***

THIS NUREG CONSTITUTES PART OF A LARGE DATA GATHERING AND SYNTHESIS EFFORT FOR THE NEMAHA RIDGE ARES. THE TOTAL IMPACT CANNOT BE ASSESSED UNTIL THE OVERALL PROGRAM IS COMPLETED AND SYNTHESIZED WITH SEISMIC MONITORING DATA. THIS WILL TAKE SEVERAL YEARS.

114

RIL NO: 79-061 **DATE ISSUED**: 11/10/79 **RIL TITLE**: MOLTEN SODIUM INTERACTION WITH BASALT CONCRETE

RESEARCH REVIEW GROUP NO.: 2-04 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

MOLTEN SODIUM INTERACTION WITH BASALT CONCRETE

RES COMMENTS

LARGE SCALE MOLTEN SODIUM-BASALT CONCRETE TESTS WERE CARRIED OUT IN SUPPORT OF THE NRC STAFF POSITION THAT VIGOROUS SODIUM-CONCRETE REACTIONS COULD BE EXPECTED. BASALT CONCRETE PENETRATION RATES OF ABOUT 2.5 CM. PER HOUR WERE OBTAINED. THE REACTION CONTINUES UNTIL THE SODIUM IS CONSUMED ON EITHER BARE CONCRETE OR BENEATH A DEFECTED STEEL LINER. DEFECTS AS SMALL AS 0.6 X 15 CM. DO NOT PLUG BUT PERMIT ESSENTIALLY ALL OF THE SODIUM TO REACT WITH THE CONTRETE WHILE THE REACTION PRODUCTS DEFORM THE LINER. SILICEOUS FIREBRICK INSULATING LAYERS BENEATH THE LINERS ALSO REACT READILY WITH THE SODIUM. IF THE SIDE WALLS ARE EXCLUDED, THE TOTAL CONCRETE PENETRATION IS ABOUT 50% OF THE INITIAL SODIUM POOL DEPTH.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/10/80 ACTUAL RESP. DATE: 11/09/79 USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

AS INDICATED IN DR. LEVINE'S LETTER OF OCTOBER 11, 1979, NRR REQUESTED (CASE TO LEVINE LETTER DATED 3/7/79) THAT THE CONFIRMATORY RESEARCH PROGRAM INVESTIGATE THE INHERENT RETENTION CAPABILITY FOR SODIUM AND SOME CORE DEBRIS BE REDIRECTED TOWARDS FFTF RATHER THAN CRBR FOR WHICH LICENSING ACTIVITIES HAD BEEN SUSPENDED. THERE IS NO LICENSING ACTIVITY ON CRBR AND ITS FUTURE IS UNCERTAIN. THE FFTF IS ESSENTIALLY COMPLETE, THEREFORE, THE INTEREST IN THIS EFFORT FOR LMFBR'S IS GENERIC, IN NATURE. THE MOST DIRECT APPLICATION OF THE REMAINDER OF THIS EFFORT MAY BE TOWARDS THE PROTOTYPE LARGE BREEDER STUDY.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THIS WORK STRONGLY INFLUENCED THE ADVICE AND RECOMMENDATIONS GIVEN TO THE FFTF PROJECT REGARDING THE ADEQUACY OF EXISTING FFTF CONTAINMENT MARGINS AS REPORTED IN THE STAFF'S SAFETY EVALUATION REPORT NUREG-0358, SUPPLEMENT 1, DATED MAY 1979. THE RECOMMENDATION MADE BY THE STAFF AND SUPPORTED BY ACRS INCLUDED MEANS FOR MONITORING THE CONTAINMENT ATMOSPHERE FOR RADIATION, TEMPERATURE, PRESSURE, OXYGEN, AND THE INCORPORATION OF HYDROGEN IGNITERS AS WELL AS MEANS TO SCRUB/FILTER THE CONTAINMENT ATMOSPHERE IN THE EVENT OF MELTDOWN TO REDUCE THE RADIOLOGICAL RELEASES.

*** NRR : COMMENTS AND REMARKS ***

FUTURE GENERIC STUDIES OF OTHER CONCRETE AGGRAGATES, CELL CONFIGURATIONS (CYLINDRICAL, RECTANGULAR) SHOULD BE CONDUCTED AS WELL AS TESTS WITH AND WITHOUT FLAWED LINERS. (FLAWS SIMULATING WELD CRACKS SHOULD BE CONSIDERED.) DIFFERENT TYPES OF FIREBRICK (E.G., COMMERCIAL MGO, AL2O3, ZRO2) SHOULD BE EXAMINED IN TERMS OF COMPATIBILITY WITH SODIUM AND ABILITY TO PROTECT THE CONCRETE.

RIL NO: 79-062 **DATE ISSUED**: 11/01/79 **RIL TITLE**: NEW MADRID SEISMOTECTONIC STUDY

RESEARCH REVIEW GROUP NO.: 3-02 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

NEW MADRID SEISMOTECTONIC STUDY

RES COMMENTS

AN IMPORTANT GOAL OF THE RESEARCH PROGRAM IS TO PRODUCE USEFUL SEISMOTECTONIC AND SEISMIC ZONING MAPS FOR THE STUDY AREA.

FISCAL YEAR 1978 WAS THE SECOND YEAR OF A FIVE-YEAR PROGRAM. RESULTS OF AEROMAGNETIC SURVEYS FUNDED IN FY 77 WERE INTEGRATED WITH PREVIOUSLY EXISTING DATA IN ADJACENT AREAS. EXTENSIVE GRAVITY SURVEYS WERE MADE IN KENTUCKY AND INDIANA NEAR THE INTERSECTION OF THE 38TH PARALLEL LINEAMENT AND THE NORTHEASTERN EXTENSION OF THE NEW MADRID SEISMIC ZONE. THE STATIONS WERE GRAVIMETRICALLY CONSTRUCTED. AN INTERESTING RELATIVE POSITIVE ANOMALY OCCURS PARALLEL TO THE WABASH VALLEY FAULT SYSTEM.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/01/80 ACTUAL RESP. DATE: 11/13/79 USER OFFICE REVIEWER: R. JACKSON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE GOAL OF THIS RESEARCH BY SEVERAL STATE GEOLOGICAL SURVEYS AND UNIVERSITIES IS TO DEFINE THE STRUCTURAL SETTING AND TECTONIC HISTORY OF THE REGION AROUND NEW MADRID, MISSOURI IN ORDER TO PROVIDE THE BASES FOR A MORE REALISTIC APPRAISAL OF THE EARTHQUAKE RISKS IN THE SITING OF NUCLEAR FACILITIES IN THE NORTH AMERICAN MID CONTINENT. IT IS RECOMMENDED THAT THE INFORMATION CONTAINED IN NUREG'S 0739 AND 0450 BE USED AS A BASIS FOR CONTINUING RESEARCH, AS INPUT TO THE EVALUATION OF SEISMIC RISK IN THE REGION WITHIN AND AROUND THE MISSISSIPPI EMBAYMENT, AND AS A CONTRIBUTION TO OUR UNDERSTANDING OF INTERPLATE TECTONICS IN GENERAL.

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH EFFORT THUS FAR HAS INCREASED OUR CURRENT DATA BASE AND OUR UNDERSTANDING OF EARTHQUAKE AND FAULT PHENOMENA IN THE MISSISSIPPI EMBAYMENT REGION, BUT AS YET NO DIRECT IMPACT ON LICENSING.

*** NRR : COMMENTS AND REMARKS ***

NUREG'S 0739 AND 0450 SUMMARIZE THE STUDIES AND RESULTS OF THE FIRST TWO YEARS OF A FIVE YEAR PROGRAM, THEREFORE, IT IS TOO EARLY TO ASSESS THE IMPACT ON NUCLEAR POWER PLANT LICENSING EXCEPT IN A VERY PRELIMINARY WAY. THE TOTAL IMPACT CANNOT BE ASSESSED UNTIL THE OVERALL PROGRAM IS COMPLETED AND SYNTHESIZED WITH SEISMIC MONITORING DATA.

RIL NO: 79-063 DATE ISSUED: 11/01/79 RIL TITLE: LOFT REACTOR SAFETY PROGRAM RESEARCH RESULTS

RESEARCH REVIEW GROUP NO.: 1-01 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

LOFT REACTOR SAFETY PROGRAM RESEARCH RESULTS FROM NUCLEAR LOSS-OF-COOLANT EXPERIMENTS L2-2 AND L2-3

RES COMMENTS

THE 2ND LOFT RIL SUMMARIZED THE RESULTS OF THE FIRST TWO NUCLEAR LOCE'S PERFORMED AT THE LOFT FACILITY IN FY 1979. THE TWO TESTS ARE PART OF THE L2 LARGE COLD LEG BREAK EXPERIMENTS. L2-2 WAS CONDUCTED OF A LINEAR HEAT GENERATION RATE OF 8KW/FT AND L2-3 WAS AT 12 KW/FT. BOTH TESTS, WHICH ASSUMED AVAILABILITY OF OFF-SITE POWER, DISPLAYED A DOUBLE REVERSAL OF CORE FLOW DURING DEPRESSURIZATION. THE RETURN TO POSITIVE CORE FLOW WAS SUFFICIENT TO QUENCH THE CORE PRIOR TO THE INITIATION OF EMERGENCY CORE COOLANT INJECTION. IMPROVEMENTS ON COMPUTER CODE MODELS AND NODALIZATION ARE IDENTIFIED WHICH PERMIT A GOOD PREDICTION OF THE OBSERVED PHENOMENA. ALL OF THE BEST-ESTIMATE CODES USED TO PREDICT L2-3 PREDICTED GENERALLY HIGHER CLADDING TEMPERATURES THAN WERE MEASURED.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 79-064 **DATE ISSUED**: 11/05/79 **RIL TITLE**: REVISED & AUGMENTED LIST OF EARTHQUAKE INTENSITIES FOR KA.

RESEARCH REVIEW GROUP NO.: 3-02 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

A REVISED AND AUGMENTED LIST OF EARTHQUAKE INTENSITIES FOR KANSAS, 1867-1977

RES COMMENTS

THE PURPOSE OF THIS RESEARCH IS TO GAIN A BETTER UNDERSTANDING OF THE SOURCES OF EARTHQUAKES THAT HAVE OCCURRED IN THE REGION AS AN AID TO DEVELOPING A MORE RATIONAL EVALUATION OF EARTHQUAKE RISK AS IT APPLIES TO THE SITING AND DESIGN OF NUCLEAR FACILITIES.

TWENTY-FIVE EARTHQUAKES WHOSE EPICENTERS WERE WITHIN THE BORDERS OF KANSAS HAVE BEEN REPORTED DURING THE PAST 110 YEARS.

BECAUSE OF THE CRITICAL NATURE OF EARTHQUAKE INFORMATION IN ESTIMATION OF SEISMIC RISK, IT IS IMPORTANT THAT THE DATE, LOCATION, AND SIZE OF EACH EARTHQUAKE BE DETERMINED AS ACCURATELY AS POSSIBLE.

THE INVESTIGATION INCLUDED A REVIEW OF THE REFERENCES CITED FOR KANSAS EARTHQUAKES BY AUTHORS OF PREVIOUSLY PUBLISHED STATE, REGIONAL, AND NATIONAL EARTHQUAKE LISTINGS. IN ADDITION, OLD NEWSPAPER FILES, MICROFILMS, AND OTHER RECORDS AT THE UNIVERSITY OF KANSAS AND THE KANSAS STATE HISTORICAL SOCIETY WERE SEARCHED FOR REPORTS WHICH MAY HAVE BEEN PREVIOUSLY OVERLOOKED OR NOT RECORDED.

THIS REPORT INCLUDES A COMPLETE LIST OF ALL FELT REPORTS COMPILED DURING THIS STUDY.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/05/80 ACTUAL RESP. DATE: 12/05/79 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE GOAL OF THIS RESEARCH WAS TO REVIEW THE REPORTS OF ALL EARTHQUAKES WHOSE EPICENTERS WERE WITHIN THE BOUNDARIES OF KANSAS. THIS RESEARCH IS PART OF A COOPERATIVE GEOLOGIC, SEISMIC, AND GEOPHYSICAL RESEARCH PROGRAM BY SEVERAL STATE GEOLOGICAL SURVEYS THAT IS SEEKING TO DEFINE THE STRUCTURAL SETTING AND TECTONIC HISTORY OF THE NEMAHA UPLIFT AND THE MIDCONTINENT GRAVITY ANOMALY IN ORDER TO PROVIDE THE BASES FOR A MORE REALISTIC APPRAISAL OF THE EARTHQUAKE RISKS IN THE SITING OF NUCLEAR FACILITIES IN THE NORTH AMERICAN MID CONTINENT. IT IS RECOMMENDED THAT THE INFORMATION CONTAINED IN NUREG/CR-0294 BE USED AS A BASIS FOR CONTINUING RESEARCH AND AS INPUT TO THE EVALUATION OF SEISMIC RISK IN THE REGION WITHIN AND AROUND THE NEMAHA UPLIFT.

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH EFFORT THUS FAR HAS INCREASED OUR CURRENT DATA BASE AND OUR UNDERSTANDING OF EARTHQUAKE PHENOMENA IN THE VICINITY OF THE NEMAHA UPLIFT, BUT AS YET HAS HAD NO DIRECT IMPACT ON LICENSING. NUREG/CR-0294 HAS BEEN REFERENCED BY AN INTERVENOR IN THE WOLF CREEK HEARING. THE INTERVENOR REQUESTED THE STAFF TO REASSESS THE SAFE SHUTDOWN EARTHQUAKE (SSE) AT THE WOLF CREEK SITE IN LIGHT OF THE NEW INFORMATION PRESENTED IN THIS NUREG. THE STAFF REVIEWED THE REPORT AND FOUND THAT THE SSE AT THE WOLF CREEK SITE WAS STILL ADEQUATELY CONSERVATIVE.

*** NRR : COMMENTS AND REMARKS ***

NUREG/CR-0294 COMPRISES A PART OF A FIVE-YEAR DETAILED STUDY OF THE SOURCES OF SEISMICITY IN THE NEMAHA UPLIFT AREA. THIS IS AN INTERIM TOPICAL REPORT PRESENTING RESULTS OF WORK COMPLETED IN PHASE I; THEREFORE, IT IS TOO EARLY TO ASSESS THE IMPACT ON NUCLEAR POWER PLANT LICENSING EXCEPT IN A VERY PRELIMINARY WAY. THE TOTAL IMPACT CANNOT BE ASSESSED UNTIL THE OVERALL PROGRAM IS COMPLETED AND SYNTHESIZED WITH SEISMIC MONITORING DATA. THESE PRELIMINARY RESULTS ARE BEING CONSIDERED IN THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. THE STAFF DOES DISAGREE WITH ONE OF THE RESULTS STATED IN THE NUREG - THE 1867 MANHATTAN EARTHQUAKE. THE ASSIGNMENT OF INTENSITY VII-VIII IS BASED UPON AN 1877 REPORT OF LIQUEFACTION ON A FARM ON THE FLOOD-PLAIN OF THE KANSAS GEOLOGICAL SURVEY. THAT OBSERVATION WAS ASSIGNED INTENSITY VIII AND PLACED CLOSE TO THE EPICENTER BY THE KANSAS GEOLOGICAL SURVEY. MUCH RECENT WORK HAS SHOWN THAT LIQUEFACTION IS EXTREMELY DEPENDENT UPON LOCAL SITE CONDITIONS AND MAY OCCUR IN ISOSEISMAL AREAS THAT MAY OTHERWISE BE ASSOCIATED WITH INTENSITIES LESS THAN VIII (AS LOW AS VI FOR EXAMPLE). THE STAFF AGREES WITH THE STANDARD REFERENCES WHICH LIST THIS EARTHQUAKE AS AN INTENSITY VII (MM). THE STAFF ALSO FINDS THE EPICENTRAL LOCATION OF THE 1867 MANHATTAN EARTHQUAKE QUESTIONABLE. ACCORDING TO THE KANSAS GEOLOGICAL SURVEY, SHAKING AND BUILDING DAMAGE EQUIVALENT TO INTENSITY VII OCCURRED OVER AN AREA AT LEAST 200 KM ACROSS. PINPOINTING THE EPICENTER WITHIN THAT AREA MAY BE BEYOND THE RESOLVING POWER OF THE PRESENT DATA.

RIL NO: 79-065 **DATE ISSUED**: 11/05/79 **RIL TITLE**: BEDROCK GEOLOGIC MAP OF MARLBOROUGH & SHREWSBURY, MA

RESEARCH REVIEW GROUP NO.: 3-01 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

RECONNAISSANCE BEDROCK GEOLOGIC MAP OF MARLBOROUGH QUADRANGLE, MA AND RECONNAISSANCE BEDROCK GEOLOGIC MAP OF SHREWSBURY QUADRANGLE, MA

RES COMMENTS

THE MAPS TRANSMITTED BY THIS RIL ARE PRODUCTS OF THE NEW ENGLAND SEISMOTECTONIC STUDY WHICH IS A PROGRAM OF INVESTIGATIONS TO BETTER UNDERSTAND THE MANIFESTATIONS AND CAUSES OF SEISMICITY IN NEW ENGLAND AND ADJACENT AREAS TO ASSESS THE SEISMIC HAZARD TO PROSPECTIVE NUCLEAR POWER PLANTS IN THE REGION. RES RECOMMENDS 1) THAT SD AND NRR CONSIDER THE MAPS AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/05/80 ACTUAL RESP. DATE: 01/09/80 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THESE TWO GEOLOGIC MAPS ARE PRODUCTS OF THE NEW ENGLAND SEISMOTECTONIC STUDY, WHICH IS A PROGRAM OF INVESTIGATIONS TO ASSESS THE SEISMIC HAZARD OF THE REGION. THEY CONTAIN THE KIND OF DETAIL THAT IS NEEDED IN AREAS OF COMPLEX MAJOR FAULTING AND/OR RELATIVELY HIGH SEISMICITY. THEREFORE, IT IS RECOMMENDED THAT THE MAPS BE CONSIDERED AS INPUT INFORMATION TO THE DEVELOPMENT OF A SEISMOTECTONIC PROVINCE MAP AND AS A BASIS FOR CONTINUED STUDY IN THE AREA.

*** NRR : IMPACT OF RESULTS ***

THE DATA ON THE MAPS HAVE NO DIRECT IMPACT ON LICENSING ACTIVITIES, BUT HAVE ADDED TO THE STAFF'S GENERAL KNOWLEDGE REGARDING THE MOST GEOLOGICALLY COMPLEX AREA IN NEW ENGLAND. THEY CONFIRM THAT THERE IS A MAJOR STRUCTURAL BOUNDARY SEPARATING SOUTHEASTERN MASSACHUSETTS FROM THE REST OF THE NEW ENGLAND PIEDMONT PROVINCE. NO EVIDENCE OF RECENT MOVEMENT ON THE FAULTS WAS FOUND.

*** NRR : COMMENTS AND REMARKS ***

THE BENEFITS OF INVESTIGATIVE EFFORTS SUCH AS THIS WILL NOT BE FULLY REALIZED UNTIL OTHER GEOLOGICALLY COMPLEX AND/OR RELATIVELY HIGH SEISMIC AREAS ARE STUDIED AND ALL THE INFORMATION SYNTHESIZED AND INTERPRETED AT THAT TIME THE PRODUCTS WILL CONTRIBUTE TO THE CONSTRUCTION OF A SEISMOTECTONIC PROVINCE MAP.

RIL NO: 79-066 **DATE ISSUED**: 11/06/79 **RIL TITLE**: STUDY OF REGIONAL TECTONICS & SEISMICITY OF E. KANSAS

RESEARCH REVIEW GROUP NO.: 3-01 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B6172	TECT & SEIS OF KANSAS		MURPHY A

RIL SUBJECT/DESCRIPTION

A STUDY OF THE REGIONAL TECTONICS AND SEISMICITY OF EASTERN KANSAS - SUMMARY OF PROJECT ACTIVITIES AND RESULTS TO THE END OF THE SECOND YEAR OR SEPTEMBER 30, 1978

RES COMMENTS

THIS RIL TRANSMITS RESULTS TO SEPTEMBER 30, 1978 OF THE STUDY CONDUCTED OF THE EARTH SCIENCE PARAMETERS OF THE NEMAHA UPLIFT AND THE MIDCONTINENT GRAVITY ANOMALY GEOLOGIC STRUCTUCTURES. THE INFORMATION GAINED IS OF VITAL IMPORTANCE IN THE SITING AND LICENSING OF NUCLEAR POWER PLANTS. THIS RIL PRESENTS PROJECT WORK COMPLETED IN PHASES I AND II OF A 3-PHASE PROJECT AND PRESENTS 1) EXISTING DATA SYNTHESIS, AND 2) ACQUISITION OF NEW DATA, SEISMIC NETWORK INSTALLATION AND OPERATION.

RES RECOMMENDS THAT SD AND NRR CONSIDER THIS AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

DOCUMENT ISSUED: NUREG/CR-0666 (ALSO SEE RIL #70, 11/19/79 AND NUREG/CR-0875).

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/06/80 ACTUAL RESP. DATE: 12/13/79 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PURPOSE OF THIS KANSAS RESEARCH IS TO GAIN A BETTER UNDERSTANDING OF THE SOURCES OF EARTHQUAKES THAT HAVE OCCURRED IN THE REGION. THE KANSAS EFFORT IS A PART OF A REGIONAL RESEARTH PROGRAM WHICH ALSO INCLUDES THE STATE GEOLOGICAL SURVEYS OF OKLAHOMA, NEBRASKA AND IOWA. THIS RESEARCH PROGRAM IS TO SERVE AS AN AID TO THE NRC IN DEVELOPING A RATIONAL EVALUATION OF EARTHQUAKE RISK AS IT APPLIES TO THE SITING, DESIGN AND REEVALUATION OF NUCLEAR FACILITIES LOCATED WITHIN THE STUDY REGION.

*** NRR : IMPACT OF RESULTS ***

THIS RESEARCH EFFORT HAS INCREASED OUR GEOLOGICAL, GEOPHYSICAL AND SEISMOLOGICAL DATA BASE OF EASTERN KANSAS. BOTH THROUGH THE ACQUISITION AND GENERATION OF NEW INFORMATION AS WELL AS THROUGH A COMPILATION AND EVALUATION OF PREVIOUSLY EXISTING DATA. THIS KANSAS RESEARCH EFFORT, IN PARTICULAR, HAS STRENGTHENED OUR CONFIDENCE IN THE PREVIOUS GEOSCIENCES DECISIONS MADE IN CONJUNCTION WITH THE SITING AND LICENSING OF THE WOLF CREEK SITE IN COFFEY COUNTY, KANSAS. FUTURE SITING AND LICENSING DECISIONS FOR EASTERN KANSAS WILL BE EXPEDITED AS A RESULT OF THIS RESEARCH EFFORT. THE RESULTS OF THE REGIONAL RESEARCH EFFORT, WHEN COMPLETED, WILL PROVE VALUABLE IN THE DEVELOPMENT OF A TECTONIC PROVINCE/SEISMIC ZONING MAP OF THE EASTERN UNITED STATES.

*** NRR : COMMENTS AND REMARKS ***

ALTHOUGH ITS CONCLUSIONS ARE PRELIMINARY (IT CONSTITUTES ONLY A TWO-YEAR SEGMENT OF A FIVE-YEAR PROGRAM INVOLVING SEVERAL STATES), THIS KANSAS RESEARCH REPORT (NUREG/CR-0666) IS A WELL THOUGHT OUT AND EXECUTED EFFORT CONTAINING CONSIDERABLE VALUABLE DATA THAT HAS NOT ONLY INCREASED OUR KNOWLEDGE, ON A BROAD SCALE, OF MID-CONTINENT TECTONICS BUT HAS, MORE DIRECTLY, PROVIDED ADDITIONAL SPECIFIC INFORMATION FOR EASTERN KANSAS. THIS NEW INFORMATION HAS NOT CAUSED LICENSING DELAYS. FUTURE LICENSING ACTION, INVOLVING NOT ONLY WOLK CREEK BUT OTHER NUCLEAR FACILITIES THAT MAY BE LOCATED WITHIN THE REGION SHOULD BE EXPEDITED AS A RESULT OF THESE STUDIES. WE STRONGLY RECOMMEND CONTINUATION OF THE KANSAS RESEARCH PROGRAM.
SEISMOLOGICALLY, HOWEVER, THE NRR STAFF QUESTIONS THE KANSAS GEOLOGICAL SURVEY'S (KGS) RATIONALE FOR THE RELOCATION OF TWO EVENTS (1867 AND 1906) FEELING THAT SUCH RELOCATION MAY BE BEYOND THE RESOLVING POWER OF THE PRESENT DATA. ADDITIONALLY, THE ASSIGNMENT OF AN INTENSITY VII-VIII OR VIII TO THE 1867 EARTHQUAKE BY THE KGS ON THE BASIS OF A SINGLE OCCURRENCE OF LIQUEFACTION REPORTED 10 YEARS AFTER THE EARTHQUAKE IS QUESTIONABLE. THE STAFF AGREES WITH THE STANDARD REFERENCES LISTING THIS 1867 EVENT AS AN INTENSITY VII (MM).

RIL NO: 79-067 **DATE ISSUED**: 11/06/79 **RIL TITLE**: REFLOODING OF SIMULATED PWR CORES AT LOW FLOW RATES

RESEARCH REVIEW GROUP NO.: 1-05 0-00 **SPONSORING OFFICE(S)**: NRR (77-02)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

REFLOODING OF SIMULATED PWR CORES AT LOW FLOW RATES

RES COMMENTS

THIS RIL DESCRIBES THE COOLING OF ELECTRICALLY HEATED RODS DURING BOTTOM FLOODING EXPERIMENTS CONDUCTED AT CONSTANT INLET FLOODING RATES. THE INFORMATION PRESENTED IS CONSIDERED APPLICABLE TO THE EVALUATION OF EMERGENCY COOLING SYSTEM PERFORMANCE IN PRESSURIZED WATER REACTORS. THE RESULTS PRESENTED IN THE RIL ARE RECOMMENDED FOR CONSIDERATION IN THE APPLICATION AND APPRAISAL OF EVALUATION MODELS FOR REFLOOD HEAT TRANSFER.

***** NO OFFICE IMPACT STATEMENTS *****

124

RIL NO: 79-068 **DATE ISSUED**: 11/11/79 **RIL TITLE**: STRUCTURAL INTEGRITY OF WELD REPAIRED PRESSURE VESSELS

RESEARCH REVIEW GROUP NO.: 1-20 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

STRUCTURAL INTEGRITY OF WELD REPAIRED PRESSURE VESSELS

RES COMMENTS

THIS RIL DESCRIBES THE RESULTS OF A TEST PROGRAM TO DETERMINE THE ADEQUACY OF A PROCEDURE WHICH EMPLOYS THE HALF-BEAD WELD REPAIR TECHNIQUE. THE RESULTS OF THE STUDIES REVEAL THAT THE ASME SECTION XI WELD REPAIR TECHNIQUE WILL PRODUCE A REPAIRED STRUCTURE HAVING A SUFFICIENTLY HIGH LEVEL OF RESIDUAL STRESSES COULD HAVE AN INSUFFICIENT MARGIN OF SAFETY AGAINST FRACTURE. ADDITIONAL RESEARCH IS NEEDED TO PERFECT MODIFICATIONS TO THE PRESENT PROCEDURE SO THAT RESIDUAL STRESSES ARE MINIMIZED OR ELIMINATED IN THE REPAIRED STRUCTURE. RES NOTES THAT SUCH A PROGRAM IS ALREADY UNDERWAY UNDER EPRI SPONSORSHIP; RES IS FOLLOWING THIS WORK.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/01/80 ACTUAL RESP. DATE: 12/19/79 USER OFFICE REVIEWER: L. SHAD

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE TESTS DESCRIBED IN THE RIL ACCOMPLISHED THEIR PURPOSE, WHICH WAS TO MEASURE THE FRACTURE BEHAVIOR OF HALF-BEAD WELD REPAIRS IN A PRESSURE VESSEL AT TEMPERATURES NEAR RT/NDT AND ON THE UPPER SHELF. SOUND, CRACK-FREE WELDS WERE PRODUCED, WHICH BEHAVED AS WELL AS BASE METAL WHEN THE VESSEL WAS PRESSURIZED AT THE UPPER-SHELF TEMPERATURE. HOWEVER, THE TECHNIQUE LEFT RESIDUAL TENSILE STRESSES OF YIELD STRENGTH MAGNITUDE NORMAL TO THE WELD IN THE MATERIAL ADJACENT TO THE WELD. WHEN A LARGE FLAW WAS PLACED IN THE RESIDUAL STRESS REGION AND THE VESSEL WAS PRESSURIZED AT THE RT/NDT TEMPERATURE, THE CRACK POPPED IN ABOUT 2 INCHES AT A PRESSURE OF 0.4 TIMES DESIGN AND POPPED THROUGH THE WALL AT ABOUT DESIGN PRESSURE. TO EXPLAIN THIS FRACTURE BEHAVIOR, THE EFFECTS OF RESIDUAL STRESS MUST BE CONSIDERED ADDITIVE TO THE EFFECTS OF PRESSURE WHEN THE TEMPERATURE IS IN THE TRANSITION REGION. THE TESTS DESCRIBED IN THE RIL DO NOT ADDRESS FRACTURE BEHAVIOR WHEN THE UPPER-SHELF ENERGY HAS BEEN REDUCED BY IRRADIATION. ALTHOUGH SECTION SI OF THE ASME B&PV CODE PERMITS IT, NO HALF-BEAD WELD REPAIRS OF SIGNIFICANT DEPTH WITHOUT POST-WELD STRESS RELIEF HAVE BEEN PERMITTED IN THE REACTOR COOLANT PRESSURE BOUNDARY. HOWEVER, PERMISSION TO DO SO WILL PROBABLY BE REQUESTED IN THE FUTURE. WE CONCLUDE THAT HALF-BEAD WELD REPAIR WITHOUT STRESS RELIEF CANNOT BE PERMITTED WITHOUT A FRACTURE ANALYSIS THAT MEETS THE REQUIREMENTS OF SECTION XI SUPPLEMENTED AS FOLLOWS: A) THE EFFECT OF A POSTULATED FLAW IN THE REGION OF HIGH RESIDUAL STRESS MUST BE EVALUATED. THE ASSUMED SIZE OF SUCH FLAW MUST BE JUSTIFIED BY CONSIDERATION OF THE POST WELD NDE PROCEDURES USED AND THE POSSIBILITY OF RECURRENCE OF THE CONDITIONS THAT CAUSED THE ORIGINAL FLAW (I.E., IF THE FLAW WAS SERVICE-INDUCED, ANY MEASURES TAKEN TO REDUCE FATIGUE USAGE OR OTHER CAUSES OF CRACKING SHOULD BE CONSIDERED). B) THE EFFECTS OF RESIDUAL STRESS, AS REPORTED IN THIS RIL, MUST BE ADDED TO THE EFFECTS OF PRESSURE AND OTHER LOADS IN CALCULATING K1 FOR THE POSTULATED FLAW.

*** NRR : IMPACT OF RESULTS ***

FRACTURE ANALYSIS AT UPPER-SHELF TEMPERATURES WILL REQUIRE CONSIDERATION ON A CASE-BY-CASE BASIS. THERE IS A POTENTIAL CONFLICT BETWEEN REGULATORY PRACTICE AND CURRENT PROVISIONS OF THE ASME CODE, SECTION SI, PARAGRAPH IWB-4320. THE CONCLUSIONS OF THIS RIL WILL BE TRANSMITTED TO THE RESPONSIBLE CODE BODY WITH THE SUGGESTION THAT THE REFERENCED MATERIAL DESCRIBING THE TEST PROGRAM JUST COMPLETED BE CONSIDERED. OUR GOAL WILL BE TO OBTAIN AN ADDITIONAL REQUIREMENT IN PARAGRAPH IWB-4320 THAT CALLS FOR THE FRACTURE ANALYSIS DESCRIBED ABOVE.

*** NRR : COMMENTS AND REMARKS ***

SOME EDITORIAL CORRECTIONS AND SUGGESTED CHANGES IN WORDING, WHICH DO NOT AFFECT THE CONCLUSIONS, HAVE BEEN FORWARDED TO THE ORIGINATOR OF THE RIL.

RIL NO: 79-069 DATE ISSUED: 11/19/79 RIL TITLE: INTEGRID. GEOPHYS. & GEOLOG. STUDY OF N. MADRID FAULT ZONE

RESEARCH REVIEW GROUP NO.: 3-01 0-00 SPONSORING OFFICE(S): NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

AN INTEGRATED GEOPHYSICAL AND GEOLOGICAL STUDY OF THE TECTONIC FRAMEWORK OF THE 38TH PARALLEL LINEAMENT IN THE VICINITY OF ITS INTERSECTION WITH THE EXTENSION OF THE NEW MADRID FAULT ZONE

RES COMMENTS

THIS RIL IS AN INTERIM REPORT REFLECTING INFORMATION AVAILABLE AS OF 1978. THIS INFORMATION RELATES TO A STUDY DESIGNED TO DEFINE THE STRUCTURAL SETTING AND TECTONIC HISTORY OF THE AREA TO REALISTICALLY EVALUATE EARTHQUAKE RISKS IN THE SITING OF NUCLEAR POWER PLANTS. WHILE THESE INTERIM RESULTS ARE NOT DEFINITIVE, RES RECOMMENDS THAT THE CURRENT PRACTICE OF EXTENDING THE NEW MADRID 1811-1812 EARTHQUAKES NORTH OF THE ROUGH CREEK FAULT ZONE (38TH PARALLEL LINEAMENT) BE CONTINUED UNTIL ADDITIONAL DATA BEING DEVELOPED INDICATE THAT THIS PRACTICE SHOULD BE CHANGED. WE ALSO RECOMMEND THAT THE INFORMATION IN NUREG/CR-0449 BE CONSIDERED BY SD AND NRR AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

DOCUMENT ISSUED: NUREG/CR-0449.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/19/80 ACTUAL RESP. DATE: 01/28/80 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS STUDY AS A PART OF THE 'NEW MADRID SEISMOTECTONIC STUDY' WHICH IS A COORDINATED PROGRAM OF GEOLOGICAL, GEOPHYSICAL, AND SEISMOLOGICAL INVESTIGATIONS OF THE AREA WITHIN A 200 MILE RADIUS OF NEW MADRID, MISSOURI. THE PURPOSE OF THE RESEARCH IS TO DEFINE THE STRUCTURAL SETTING AND TECTONIC HISTORY OF THE AREA TO FACILITATE EVALUATION OF EARTHQUAKE RISK IN THE SITING OF NUCLEAR FACILITIES. A GOAL OF THIS PROGRAM IS THE PRODUCTION OF SEISMOTECTONIC AND SEISMIC ZONING MAPS OF THE STUDY AREA. INTERPRETATION OF THE DATA IS AT A PRELIMINARY STAGE. THE RESULTS TO DATE HAVE ADDED TO THE GENERAL KNOWLEDGE OF THE STAFF EVEN THOUGH IT IS TOO EARLY IN THE PROGRAM TO MAKE DIRECT APPLICATION TO THE LICENSING PROCESS.

*** NRR : IMPACT OF RESULTS ***

WHILE THE INTERIM RESULTS ARE NOT DEFINITIVE, THEY TEND TO CONFIRM THE CONSERVATISM INHERENT IN THE CURRENT PRACTICE OF EXTENDING THE NEW MADRID 1811-1812 EARTHQUAKES, NORTH OF THE 38TH PARALLEL LINEAMENT IN LICENSING PROCEDURES.

*** NRR : COMMENTS AND REMARKS ***

NONE

RIL NO: 79-070 DATE ISSUED: 11/19/79 RIL TITLE: SEISMICITY & TECTONIC RELATION OF NEMAHA UPLIFT IN OK.

RESEARCH REVIEW GROUP NO.: 3-01 0-00 SPONSORING OFFICE(S): NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

SEISMICITY AND TECTONIC RELATIONSHIPS OF THE NEMAHA UPLIFT IN OK, PART II, JAN. 1979

RES COMMENTS

THIS RESEARCH IS BEING CONDUCTED TO STUDY THE EARTH SCIENCE PARAMETERS OF THE NEMAHA UPLIFT AND THE MIDCONTINENT GRAVITY ANOMALY. THIS RIL FORWARDS THE REPORT WHICH PRESENTS RESULTS OF PHASE II OF A 3-PHASE REPORT RES RECOMMENDS THAT THE INFORMATION CONTAINED IN NUREG/CR-0875 BE CONSIDERED BY SD AND NRR AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

DOCUMENT ISSUED: NUREG/CR-0875 (ALSO SEE RIL #66, 11/16/79 AND NUREG/CR-0666).

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/19/80 ACTUAL RESP. DATE: 12/12/79 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SITING IN OKLAHOMA, KANSAS AND NEBRASKA HAS BEEN MADE MORE DIFFICULT BY THE CONTROVERSY OVER THE ASSOCIATION OF SEISMICITY WITH THE NEMAHA RIDGE. WITH EXCEPTION OF NEW EARTHQUAKE DATA, THE DATA DESCRIBED IN THE REPORT IS NOT DIRECTLY APPLICABLE TO THE REGULATORY PROCESS. PHASE III SHOULD PROVIDE THE USEABLE DATA.

*** NRR : IMPACT OF RESULTS ***

THE PROJECT HAS NOT BEEN COMPLETED, NOR FINAL CONCLUSIONS DRAWN. THE GEOLOGIC AND SEISMIC DATA BASE HAVE BEEN BROADENED. PRELIMINARY SEISMIC DATA SUGGESTS A ZONE OF EARTHQUAKES BEGINNING NEAR EL RENO STRIKING NORHTEAST AND CUTTING DIAGONALLY ACROSS THE NEMAHA STRUCTURE, A CONCENTRATION NEAR WILSON AND SEVERAL EPICENTERS PARALLEL THE NORTHERN FRONT OF OUACHITAS. ALSO, THE EARTHQUAKE TO DATE SUPPORTS STAFF CONCLUSION THAT THE LEVEL OF SEISMICITY IS LOW FOR NORTHEAST OKLAHOMA. THE LARGEST MAGNITUDE RECORDED WITHIN 10-20 KM OF THE BLACK FOX SITE IS 1.4. THE LOW LEVEL OF SEISMICITY ALSO APPLIES TO WESTERN OKLAHOMA AND POSSIBLY THE PANHANDLE. WHEN COMPLETE, THE GEOLOGIC AND SEISMIC DATA ARE IN, HOPEFULLY, THE STAFF WILL BE ABLE TO CONCLUSIVELY DETERMINE IF THE NEMAHA UPLIFT IS A TECTONIC STRUCTURE AND RELATE THE SEISMICITY TO THE CAUSITIVE STRUCTURE, THEREBY, MORE CONCLUSIVELY DEFINING THE SSE FOR NEW PLANTS IN THE AREA.

*** NRR : COMMENTS AND REMARKS ***

NONE

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 03/19/80 ACTUAL RESP. DATE: 03/19/80 USER OFFICE REVIEWER: R. MINOGUE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

SD RECOGNIZES THAT THE NUREG REPORTS REPRESENT ONLY A PORTION OF A FIVE YEAR PROGRAM. NONTHELESS, THEY SHOULD PROVIDE USEFUL INPUT FOR NRC STANDARDS DEVELOPMENT PARTICULARLY IN REGARD TO A POSSIBLE REVISION OF APPENDIX A TO CFR PART 100, AND THE DEVELOPMENT OF TECTONIC PROVINCE OR SEISMIC ZONING MAPS OF THE EASTERN UNITED STATES.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-071 **DATE ISSUED**: 11/19/79 **RIL TITLE**: REGIONAL TECTONICS AND SEISMICITY OF E. NEBRASKA ANNUAL RPT.

RESEARCH REVIEW GROUP NO.: 3-01 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

REGIONAL TECTONICS AND SEISMICITY OF EASTERN NEBRASKA ANNUAL REPORT - JUNE 1, 1977 - MAY 30, 1978

RES COMMENTS

THE PURPOSE OF THIS RESEARCH IS TO STUDY THE EARTH SCIENCE PARAMETERS OF THE NEMAHA UPLIFT AND THE MIDCONTINENT GRAVITY ANOMALY. KNOWLEDGE OF THESE GEOLOGICAL STRUCTURES IS NEEDED TO DETERMINE WHETHER OR NOT THEY ARE LOCALIZERS OF EARTHQUAKES. THE INFORMATION GAINED IS OF IMPORTANCE IN THE SITING AND LICENSING OF NUCLEAR POWER PLANTS.

THIS INTERIM REPORT PRESENTS AND INTERPRETS INFORMATION OBTAINED BETWEEN JUNE 1, 1977 TO MAY 30, 1978.

RES RECOMMENDS THAT THE INFORMATION CONTAINED IN NUREG/CR-0876 BE CONSIDERED BY SD AND NRR AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/19/80 ACTUAL RESP. DATE: 03/12/80 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PURPOSE OF THIS RESEARCH IN THE CENTRAL STABLE REGION IS AN ATTEMPT TO DETERMINE THE REASONS FOR, AND SOURCE OF, LARGER EARTHQUAKES IN THE EASTERN UNITED STATES. THIS NEBRASKA EFFORT CONSTITUTES A PORTION OF A COOPERATIVE GEOLOGIC, SEISMIC, AND GEOPHYSICAL EFFORT OF THE STATE GEOLOGICAL SURVEYS OF OKLAHOMA, KANSAS, NEBRASKA, IOWA, AND MINNESOTA TO STUDY THE EARTH SCIENCE PARAMETERS OF THE NEMAHA UPLIFT AND THE MIDCONTINENT GRAVITY ANOMALY. THIS REPORT (NUREG/CR-0876) PRIMARILY ADDRESSES THE GEOLOGY, STRUCTURE, TECTONICS, AND SEISMICITY OF SOUTHEASTERN NEBRASKA IN THE VICINITY OF THE HUMBOLDT FAULT ZONE (A GEOLOGIC STRUCTURE NEAR THE NEMAHA UPLIFT). THIS NEBRASKA RESEARCH PROGRAM, IN CONJUNCTION WITH OTHER REGIONAL EFFORTS, IS TO SERVE AS AN AID TO THE NRC IN DEVELOPING A RATIONAL EVALUATION OF EARTHQUAKE RISK AS IT APPLIES TO THE SITING, DESIGN AND REEVALUATION OF NUCLEAR FACILITIES LOCATED WITHIN THE STUDY REGION.

*** NRR : IMPACT OF RESULTS ***

THIS RESEARCH EFFORT HAS INCREASED OUR KNOWLEDGE OF THE GEOLOGY, STRUCTURE, TECTONICS AND SEISMICITY OF EASTERN NEBRASKA (VICINITY OF THE NEMAHA UPLIFT), BUT HAS NO DIRECT IMPACT ON LICENSING.

*** NRR : COMMENTS AND REMARKS ***

NUREG/CR-0876 CONSTITUTES ONLY A PORTION OF A MAJOR REGIONAL EFFORT DIRECTED TOWARD DETERMINATION OF THE SOURCES OF SEISMICITY IN THE MIDCONTINENT AREA IN THE VICINITY OF THE MIDCONTINENT GRAVITY ANOMALY AND THE NEMAHA UPLIFT. THIS NUREG, COMBINED WITH THE OTHER RESEARCH REPORTS, HAS THE POTENTIAL FOR HELPING TO RESOLVE ONE OF THE MAJOR QUESTIONS PERPETUALLY CONFRONTING THE NUCLEAR REGULATORY COMMISSION WHEN ASSESSING NUCLEAR POWER PLANT APPLICATIONS IN THE MIDCONTINENT AREA - NAMELY, WHAT IS THE SOURCE (OR MOST LIKELY SOURCE) OF SEISMICITY OCCURRING IN THE VICINITY OF THE NEMAHA UPLIFT AND MIDCONTINENT GRAVITY ANOMALY. SINCE THIS REGIONAL STUDY IS QUITE COMPREHENSIVE, PERIPHERAL STUDIES, APPARENTLY NOT DIRECTLY-RELATED TO EITHER THE NEMAHA UPLIFT OR THE MIDCONTINENT GRAVITY ANOMALY, HAVE BEEN CONDUCTED. IN THE CASE OF THIS NUREG, THE REPORT ENTITLED 'RELATION OF EARTHQUAKE EPICENTERS TO GLACIATION,' IS SOMEWHAT PERIPHERAL TO THE MAIN PURPOSE OF THE OVERALL RESEARCH EFFORT BUT DOES ADDRESS A GENERIC ISSUE OF SOME RELEVANCE.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 03/19/80 ACTUAL RESP. DATE: 03/19/80 USER OFFICE REVIEWER: R. MINOGUE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

SD RECOGNIZES THAT THE NUREG REPORTS REPRESENT ONLY A PORTION OF A FIVE YEAR PROGRAM. NONETHELESS, THEY SHOULD PROVIDE USEFUL INPUT FOR NRC STANDARDS DEVELOPMENT PARTICULARLY IN REGARD TO A POSSIBLE REVISION OF APPENDIX A TO CFR PART 100, AND THE DEVELOPMENT OF TECTONIC PROVINCE OF SEISMIC ZONING MAPS OF THE EASTERN UNITED STATES.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-072 DATE ISSUED: 11/[illegible]6/79 RIL TITLE: NEW ENGLAND SEISMOTECTONIC STUDY ACTIVITIES FY77 & 78

RESEARCH REVIEW GROUP NO.: 3-01 0-00 SPONSORING OFFICE(S): NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

NEW ENGLAND SEISMOTECTONIC STUDY ACTIVITIES DURING FISCAL YEARS 1977 AND 1978

RES COMMENTS

THE NEW ENGLAND SEISMOTECTONIC STUDY IS A 5-YEAR PROGRAM TO STUDY THE GEOLOGY AND SEISMICITY OF NEW ENGLAND AND CONTIGUOUS AREAS TO ASSESS THE POTENTIAL SEISMIC HAZARD TO PROSPECTIVE NUCLEAR POWER PLANT SITES IN THE REGION. PRELIMINARY RESULTS THUS FAR DOCUMENT THE PROMINENCE OF FAULTING IN THE REGION AND DEMONSTRATE THE EFFECTIVENESS OF REMOTE-SENSING, MAGNETIC-LINEAMENT AND GRAVITY-LINEAMENT ANALYSES TO REVEAL FAULTS IN THE REGION. THE REPORTS FORWARDED WITH RIL DESCRIBE THE STUDY FROM JULY 1, 1977 TO JUNE 30, 1978.

RES RECOMMENDS THAT THE INFORMATION CONTAINED IN NUREG/CR-0081 AND NUREG/CR-0930 BE CONSIDERED BY SD AND NRR AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

DOCUMENTS ISSUED: NUREG/CR-0081; NUREG/CR-0930.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/16/80 ACTUAL RESP. DATE: 01/11/80 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE STUDY IS A COOPERATIVE EFFORT AMONG FEDERAL AGENCIES, UNIVERSITIES, AND STATE GEOLOGICAL SURVEYS IN A PROGRAM TO STUDY THE GEOLOGY AND SEISMOLOGY OF NEW ENGLAND, WITH THE INTENT TO PROVIDE A STRONG BASIS FOR THE ASSESSMENT OF THE SEISMIC HAZARD IN THE REGION IN ACCORDANCE WITH NRC REGULATIONS. THE SUBJECT NUREG'S ARE A SUMMARY OF THE RESULTS OF THE FIRST 2 YEARS ACTIVITY OF A 5 YEAR PROGRAM. THE RESULTS HAVE ADDED GREATLY TO THE GENERAL KNOWLEDGE OF THE STAFF.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS HAVE THUS FAR HAD NO DIRECT IMPACT ON LICENSING DECISIONS. THEY TEND, HOWEVER, TO CONFIRM PAST CONCLUSIONS THAT CURRENT SEISMICITY, DETECTED BY INSTRUMENTS, IS CONCENTRATED IN THE SAME GENERAL AREAS AS HISTORIC EARTHQUAKES RECORDED DURING THE PAST SEVERAL HUNDRED YEARS; AND THERE IS NO DEMONSTRATABLE CORRELATION BETWEEN SEISMICITY AND MAPPED FAULTS.

*** NRR : COMMENTS AND REMARKS ***

AN ADDITIONAL BENEFIT OF THIS PROGRAM IS THAT IT HAS DEMONSTRATED THE EFFECTIVENESS OF IDENTIFYING FAULTS USING REMOTE SENSING TECHNIQUES. IT IS RECOMMENDED THAT THE INFORMATION CONTAINED IN NUREG/CR-0939 AND NUREG/CR-0081 BE USED AS INPUT TO THE CONSTRUCTION OF A SEISMOTECTONIC MAP AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES.

RIL NO: 79-073 DATE ISSUED: 11/16/79 RIL TITLE: IN VIVO COUNTING AT SELECTED URANIUM MILLS

RESEARCH REVIEW GROUP NO.: 5-23 0-00 SPONSORING OFFICE(S): SD (79-5)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

IN VIVO COUNTING AT SELECTED URANIUM MILLS

RES COMMENTS

THIS RESEARCH PROJECT PROVIDED MEASUREMENTS OF THE INTERNAL DEPOSITION OF URANIUM IN THE LUNGS AND RADIUM IN THE SKELETON OF URANIUM MILL WORKERS. THE IN VIRO COUNTING WAS CONDUCTED AT THE NINE MILL SITES. NO WORKER HAD MORE THAN THE MAXIMUM PERMISSIBLE ORGAN BURDEN.

RES RECOMMENDS THAT RESULTS PRESENTED IN NUREG/CR-0841 BE USED BY SD IN DETERMINING THE VALUE OF TAKING IN VIRO MEASUREMENTS AT MILL SITES.

DOCUMENT ISSUED: NUREG/CR-0841.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 03/16/80 ACTUAL RESP. DATE: 05/22/80 USER OFFICE REVIEWER: S. MCGUIRE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE RESEARCH PERFORMED ON IN VIVO COUNTING OF URANIUM MILL WORKERS BEARS DIRECTLY ON BIOASSAY REQUIREMENTS AT URANIUM MILLS. NRC'S POLICY ON BIOASSAY AT URANIUM MILLS IS CONTAINED IN REGULATORY GUIDE 8.22, 'BIOASSAY AT URANIUM MILLS.'

*** SD : IMPACT OF RESULTS ***

THE RESEARCH DEMONSTRATED THAT URANIUM CONCENTRATION IN THE LUNGS OF URANIUM MILL WORKERS WERE NOT HIGHER THAN EXPECTED. THE RESEARCH ALSO DEMONSTRATED THAT COMMERCIALLY AVAILABLE IN VIVO COUNTING FOR NATURAL URANIUM USING MOBILE TRUCK MOUNTED COUNTERS IS NOT SUFFICIENTLY SENSITIVE TO DETECT URANIUM IN MILL WORKERS. SUCH IN VIVO COUNTING IS NOT A USEFUL TOOL AT URANIUM MILLS.

*** SD : COMMENTS AND REMARKS ***

THE RESEARCH PERFORMED WAS QUITE USEFUL.

RIL NO: 79-074 DATE ISSUED: 11/16/79 RIL TITLE: STEADY-STATE FUEL ROD BEHAVIOR CODE: FRAPCON-1

RESEARCH REVIEW GROUP NO.: 1-12 0-00 SPONSORING OFFICE(S): NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

STEADY-STATE FUEL ROD BEHAVIOR CODE: FRAPCON-1

RES COMMENTS

THIS RIL TRANSMITS THE DESCRIPTION AND ASSESSMENT DOCUMENTATION OF THE LATEST VERSION OF THE STEADY-STATE FUEL ROD BEHAVIOR CODE - FRAPCON-1. FRAPCON-1 IS A FORTRAN IV COMPUTER MODEL WHICH CONSIDERS THE COUPLED EFFECTS OF FUEL AND CLADING DEFORMATION TEMPERATURE AND INTERNAL GAS PRESSURE ON THE OVERALL RESPONSE CHARACTERISTICS OF A FUEL ROD OPERATING UNDER NORMAL CONDITIONS. THE CODE IS USED: 1) AS A BE CODE TO INITIALIZE THE CURRENT RES BEST ESTIMATE TRANSIENT CODE; 2) AS A STAND-ALONE, BEST ESTIMATE STEADY-STATE CODE; OR 3) AS A LICENSING TOOL WITH APPROPRIATE EM MODELS SUPPLIED BY NRR.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 79-075 **DATE ISSUED**: 11/27/79 **RIL TITLE**: INVENTORY, DETECTION, CATALOG & MAP OF OKLAHOMA EARTHQUAKES

RESEARCH REVIEW GROUP NO.: 3-01 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

INVENTORY, DETECTION, AND CATALOG OF OKLAHOMA EARTHQUAKES AND EARTHQUAKE MAP OF OKLAHOMA, MAP GM-19

RES COMMENTS

THIS RESEARCH WAS A COOPERATIVE GEOLOGIC, SEISMIC AND GEOPHYSICAL EFFORT TO STUDY THE EARTH SCIENCE PARAMETERS OF THE NEMAHA UPLIFT AND THE MIDCONTINENT GRAVITY ANOMALY. A KNOWLEDGE OF THESE GEOLOGIC STRUCTURES IS OF VITAL IMPORTANCE IN THE SITING AND LICENSING OF NUCLEAR POWER PLANTS. PROJECT WORK IS SEPARATED INTO THREE PHASES. THIS RIL WITH ITS ENCLOSURES PRESENTS RESULTS OF WORK COMPLETED IN PHASE I.

RES RECOMMENDS THAT THE INFORMATION IN THE INVENTORY BE CONSIDERED BY SD AND NRR AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES.

DOCUMENTS ISSUED: MAP GM-19; REPORT: INVENTORY, DETECTION AND CATALOG OF OKLAHOMA EARTHQUAKES.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/27/80 ACTUAL RESP. DATE: 01/28/80 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RESEARCH IS PART OF A COOPERATIVE GEOLOGIC, SEISMIC AND GEOPHYSICAL EFFORT OF THE STATE GEOLOGICAL SURVEYS OF OKLAHOMA, KANSAS, NEBRASKA, IOWA, AND MINNESOTA TO STUDY THE EARTH SCIENCE PARAMETERS OF THE MIDCONTINENT GRAVITY ANOMALY. THE OVERALL GOAL OF THIS PROGRAM IS TO ESTABLISH A STRONG BASIS FOR DETERMINING THE SEISMIC RISK FOR NUCLEAR POWER FACILITIES IN THESE SECTIONS OF THE CENTRAL STABLE REGION. IT IS TOO EARLY IN THE PROGRAM FOR THE DATA TO HAVE DIRECT APPLICATION TO THE LICENSING PROCESS, HOWEVER, WHEN ALL INFORMATION HAS BEEN INTERPRETED AND SYNTHESIZED, IT WILL BE USED TO DEVELOP A SEISMOTECTONIC PROVINCE OR SEISMIC ZONING MAP.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THIS RESEARCH HAVE NOT HAD A DIRECT IMPACT ON LICENSING ACTIVITIES, HOWEVER, THEY HAVE ADDED TO OUR GENERAL KNOWLEDGE REGARDING THE TECTONIC SETTING OF THE REGION IN WHICH OKLAHOMA LIES, AND HAVE PROVIDED A COMPLETE CATALOGUE AND EARTHQUAKE MAP OF OKLAHOMA.

*** NRR : COMMENTS AND REMARKS ***

IT IS RECOMMENDED THAT THE DATA IN 'INVENTORY, DETECTION AND CATALOG OF OKLAHOMA EARTHQUAKES AND EARTHQUAKES MAP ON GM-19' BE CONSIDERED BY THE OFFICE OF STANDARDS DEVELOPMENT AND THE OFFICE OF NUCLEAR REACTOR REGULATION AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 03/27/80 ACTUAL RESP. DATE: 03/19/80 USER OFFICE REVIEWER: R. MINOGUE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

SD RECOGNIZES THAT THE NUREG REPORTS REPRESENT ONLY A PORTION OF A FIVE YEAR PROGRAM. NONETHELESS, THEY SHOULD PROVIDE USEFUL INPUT FOR NRC STANDARDS DEVELOPMENT PARTICULARLY IN REGARD TO A POSSIBLE REVISION OF APPENDIX A TO CFR PART 100, AND THE DEVELOPMENT OF TECTONIC PROVINCE OR SEISMIC ZONING MAPS OF THE EASTERN UNITED STATES.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-076 DATE ISSUED: 12/28/79 RIL TITLE: ANNEALING OF IRRADIATED REACTOR PRESSURE VESSELS

RESEARCH REVIEW GROUP NO.: 1-20 0-00 SPONSORING OFFICE(S): NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

ANNEALING OF IRRADIATED REACTOR PRESSURE VESSELS

RES COMMENTS

THE RESEARCH PROJECT REVIEWED THE INFORMATION DEVELOPED OVER THE PAST 15 YEARS ON THE USE OF POST-IRRADIATION HEAT TREATMENT (ANNEALING) TO RECOVER THE PRE-IRRADIATION PROPERTIES OF REACTOR VESSELS OF COMMERCIAL NUCLEAR POWER PLANTS FOR COMMERCIAL SAFE OPERATION. THE INFORMATION IS TO BE VIEWED AS PROVIDING A BACKGROUND FOR INTERPRETING CURRENT AND FUTURE RESEARCH ACTIVITIES AND POTENTIAL LICENSING APPLICATIONS OF VESSEL STEEL ANNEALING.

DOCUMENT ISSUED: NUREG/CR-0486.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 04/28/80 ACTUAL RESP. DATE: 05/19/80 USER OFFICE REVIEWER: P. RANDALL

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

AS AN INTERIM PROGRESS REPORT ON THE FEASIBILITY STUDIES SPONSORED BY THE NRC AND OTHERS THE RIL IS A VERY SATISFACTORY REPORT. CONCLUSIONS AND RECOMMENDATIONS HAVE NOT YET BEEN MADE, HENCE NO COMMENTS REGARDING APPLICATION OF THE FINDINGS ARE IN ORDER AT THIS TIME.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-077 **DATE ISSUED**: 12/28/79 **RIL TITLE**: ORIGIN OF SURFACE LINEAMENTS IN NEMAHA COUNTY, KANSAS

RESEARCH REVIEW GROUP NO.: 3-01 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

ORIGIN OF SURFACE LINEAMENTS IN NEMAHA COUNTY, KANSAS

RES COMMENTS

THE PURPOSE OF THIS RESEARCH WAS TO GAIN A BETTER UNDERSTANDING OF THE SOURCES OF EARTHQUAKES THAT HAVE OCCURRED AS AN AID TO DEVELOPING A MORE RATIONAL EVALUATION OF EARTHQUAKE RISK AS IT APPLIES TO THE SITING AND DESIGN OF NUCLEAR FACILITIES.

RES RECOMMENDS THAT INFORMATION IN NUREG/CR-0321 BE CONSIDERED BY SD AND NRR AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

DOCUMENT ISSUED: NUREG/CR-0321.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/28/80 ACTUAL RESP. DATE: 04/03/80 USER OFFICE REVIEWER: J. KNIGHT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE STATE GEOLOGICAL SURVEYS OF KANSAS, OKLAHOMA, NEBRASKA, AND IOWA ARE CONDUCTING A 5-YEAR GEOLOGICAL, SEISMOLOGICAL AND GEOPHYSICAL STUDY OF THE REGIONAL TECTONICS AND SEISMICITY OF THE NEMAHA UPLIFT AND THE MIDCONTINENT GRAVITY ANOMALY AND OTHER STRUCTURES IN THE REGION. THE GOAL OF THIS STUDY IS TO ESTABLISH A BETTER UNDERSTANDING OF EARTHQUAKE SOURCE MECHANISMS TO DETERMINE THE SEISMIC RISK FOR NUCLEAR POWER FACILITIES IN THIS PART OF THE CENTRAL STABLE REGION. THE DATA DERIVED FROM THE STUDY WILL PROVIDE DATA IN THE DEVELOPMENT OF A SEISMOTECTONIC PROVINCE MAP.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THIS STUDY HAVE NOT HAD A DIRECT IMPACT ON NUCLEAR POWER PLANT LICENSING ACTIVITIES. THEY IDENTIFY THE LINEAMENTS IN NEMAHA COUNTY AND APPEAR TO DEMONSTRATE THAT THE LINEAMENTS ARE NOT RELATED TO THE SEISMICITY IN THE AREA, WHICH ADDS TO OUR GENERAL KNOWLEDGE OF THE GEOLOGIC TOOLS THAT MAY BE EMPLOYED IN ESTABLISHING THE TECTONIC SETTING OF THE CENTRAL STABLE REGION.

*** NRR : COMMENTS AND REMARKS ***

THE STUDY OF THE 'ORIGIN OF SURFACE LINEAMENTS IN NEMAHA COUNTY, KANSAS' CONSTITUTES ONLY A PERIPHERAL STUDY AND DOES NOT DIRECTLY ADDRESS THE QUESTION OF EARTHQUAKE SOURCE MECHANISMS WHICH IS IMPORTANT TO AN UNDERSTANDING OF THE SEISMIC RISK IN THE REGION. THE STUDY IS PERIPHERAL TO THE MAIN PURPOSE OF THE OVERALL RESEARCH EFFORT BUT DOES ADDRESS A GENERIC ISSUE OF SOME RELEVANCE. IT IS RECOMMENDED THAT THE DATA CONTAINED IN NUREG/CR-0321 BE USED FOR ONGOING STUDIES IN THE AREA WHICH WILL EVENTUALLY LEAD TO THE DEVELOPMENT OF A SEISMOTECTONIC PROVINCE MAP AND A BETTER UNDERSTANDING OF THE SEISMIC RISK FOR THE SITING OF NUCLEAR FACILITIES.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 04/28/80 ACTUAL RESP. DATE: 03/19/80 USER OFFICE REVIEWER: R. MINOGUE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

SD RECOGNIZES THAT THE NUREG REPORTS REPRESENT ONLY A PORTION OF A FIVE YEAR PROGRAM. NONETHELESS, THEY SHOULD PROVIDE USEFUL INPUT FOR NRC STANDARDS DEVELOPMENT PARTICULARLY IN REGARD TO A POSSIBLE REVISION OF APPENDIX A TO CFR PART 100, AND THE DEVELOPMENT OF TECTONIC PROVINCE OR SEISMIC ZONING MAPS OF THE EASTERN UNITED STATES.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 79-078 DATE ISSUED: 12/28/79 RIL TITLE: VERTICAL LOADS IN MARK I CONTAINMENT TORUS

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR (76-13)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

VERTICAL LOADS IN MARK I CONTAINMENT TORUS

RES COMMENTS

THE RESEARCH WAS PERFORMED TO QUANTITATIVELY EVALUATE THE HYDRODYNAMIC LOAD IN THE MARK I TYPE CONTAINMENT IN THE EVENT OF A LOCA. THE TESTS CONDUCTED PROVIDE CONFIRMATION OF THE ABSOLUTE VALUES AND SENSITIVITIES OF THE AIR VENTING LOADS MEASURED IN OTHER EXPERIMENTS. THE TESTS ALSO PROVIDE EVIDENCE OF A 3-DIMENSIONAL CHARACTER OF THE UPLOAD NOT BEFORE RECOGNIZED.

THE DATA IN THE SCALING LAW EXPERIMENT VERIFIED THAT SMALL SCALE TEST DATA CAN BE SCALED UP TO PROTOTYPICAL PLANT SIZE.

THE 1/5 SCALE TORUS TEST RESULTS SUPPLEMENTED BY THE VERIFIED SCALING LAW PROVIDE AN APPROPRIATE YARDSTICK FOR LICENSING ASSESSMENT OF THE MARK I CONTAINMENT CONCERNING AIR VENTING LOADS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/28/80 ACTUAL RESP. DATE: 03/17/80 USER OFFICE REVIEWER: C. GRIMES

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

TEST RESULTS FROM THE LLL 1/5 SCALE MARK I POOL SWELL TESTS AND THE MIT POOL SWELL SCALING STUDIES WERE COMPARED TO SIMILAR TESTS AND STUDIES PERFORMED BY THE MARK I OWNERS GROUPS. RES TEST DATA WERE USED TO IDENTIFY THE SIGNIFICANT PARAMETERS AND TRENDS FOR THE PRESSURE LOADS ON THE TORUS.

*** NRR : IMPACT OF RESULTS ***

THE MIT SCALING STUDIES GENERALLY CONFIRMED THE SCALING RELATIONSHIPS USED FOR BOTH THE LLL AND MARK I OWNERS GROUP POOL SWELL TESTS, AND IDENTIFIED THE SIGNIFICANT PARAMETERS THAT AFFECT SCALING. THE LLL TEST RESULTS IDENTIFIED AN UNCERTAINTY IN THE NET UPWARD LOAD ON THE TORUS BETWEEN THE 2D AND 3D SECTORS, BUT CONFIRMED THE NET DOWNWARD LOADS AND THE BASIC PHENOMENA ASSOCIATED WITH POOL SWELL. THE LLL TEST DATA WERE USED TO QUANTIFY A MARGIN FOR THE UNCERTAINTY IN THE UPWARD TORUS LOADS.

*** NRR : COMMENTS AND REMARKS ***

NRR AND ITS CONSULTANTS DID NOT UNILATERALLY AGREE WITH THE CONCLUSIONS DRAWN BY LLL. CONSEQUENTLY, THE LLL TEST DATA WERE ADJUSTED IN ORDER TO DEVELOP THE APPROPRIATE MARGIN FOR THE NET UPWARD LOADS ON THE TORUS.

RIL NO: 79-079 **DATE ISSUED**: 12/28/79 **RIL TITLE**: EVAL. OF SEISMIC QUALIF. TESTS FOR NUC. PWR. PLANT EQUIP.

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

EVALUATION OF SEISMIC QUALIFICATION TESTS FOR NUCLEAR PLANT EQUIPMENT

RES COMMENTS

THE OBJECTIVES OF THIS TEST WERE TO SUBJECT A TYPICAL ELECTRICAL CABINET SPECIMENT TO A SERIES OF DIFFERENT CURRENTLY ACCEPTABLE SEISMIC QUALIFICATION TESTS, TO ACQUIRE THEREFROM DYNAMIC RESPONSE DATA AND TO PROVIDE A BASIS FOR COMPARISON OF THE TESTS' EFFECTIVENESS. RES CONCLUDES THAT A REASSSESSMENT OF THE TEST RESPONSE SPECTRUM (TRS) ENVELOPING A REQUIRED RESPONSE SPECTRUM (RRS) NEEDS TO BE AUGMENTED TO ASSURE PROPER DISTRIBUTION OF ENERGY WITH FREQUENCY DURING A QUALIFICATION TEST. RESONANCE SEARCHES SHOULD BE CONDUCTED FOR BOTH SIMULATOR-MOUNTED AND FLOOR MOUNTED CONFIGURATIONS FOR ITEMS WHERE DYNAMIC COUPLING WITH THE SIMULATOR TUBE IS EXPECTED.
A NEW PARAMETER, THE DAMAGE SEVENTY FACTOR, HAS BEEN DEVELOPED FOR COMPARING SEVENTY OF SEISMIC QUALIFICATION TESTS. DSF MAY MAKE IT POSSIBLE TO UPGRADE EQUIPMENT SUPPORT TO HIGHER SEISMIC EXCITATION.

DOCUMENT ISSUED: NUREG/CR-0345.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/28/80 ACTUAL RESP. DATE: 02/15/80 USER OFFICE REVIEWER: R. MATTSON & D. EISE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE RESEARCH RESULTS HAVE:

A. PROVIDED AN INDEPENDENT CONFIRMATION OF THE FOLLOWING LICENSING POSITIONS: (1) THE SINGLE FREQUENCY TEST INPUT MAY BE SEVERE FOR VERIFYING THE STRUCTURAL INTEGRITY OF PASSIVE EQUIPMENT AND SUPPORTS, BUT MAY BE INADEQUATE FOR VERIFYING THE OPERABILITY OF ACTIVE EQUIPMENT. (2) TEST ITEMS SHOULD SIMULATE THE ACTUAL SERVICE MOUNTING DURING THE TEST, AND DYNAMIC COUPLING WITH THE FIXTURE SHOULD BE AVOIDED.

B. IDENTIFIED AREAS OF FUTURE RESEARCH FOR POTENTIAL ASSISTANCE IN THE LICENSING PROCESS: (1) THE DAMAGE SEVERITY FACTOR, IF FURTHER DEVELOPED, MAY BE USEFUL TO ASSESS THE RELATIVE DAMAGE THAT CAN BE INFLICTED BY EARTHQUAKE TRANSIENTS OR TEST INPUTS TO STRUCTURAL COMPONENTS. CURRENTLY THE DSF IS NOT USEFUL IN ASSESSING FUNCTIONABILITY BUT ADDITIONAL WORK IS WARRANTED IN THIS AREA. (2) EXPLICIT GUIDANCE SHOULD BE DEVELOPED TO HANDLE GENERIC TESTING CONCERNS RELATIVE TO: (A) ENERGY CONTENT VERSUS FREQUENCY DISTRIBUTION, AND (B) PROPER VALUE OF THE ZPA LEVEL IN THE TEST INPUT.

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH RESULTS ARE ESSENTIALLY CONFIRMATIVE IN NATURE. AREAS IDENTIFIED HAVE ALREADY RECEIVED STAFF ATTENTION EVEN PRIOR TO THE BEGINNING OF THIS RESEARCH PROGRAM, CONSEQUENTLY THE RESEARCH RESULTS HAVE NO IMPACT ON REGULATORY REQUIREMENTS. HOWEVER, FUTURE EFFORTS BY RES OR THE IEEE STANDARD COMMITTEE ON REFINING CURRENT CRITERIA MAY HAVE IMPACT.

*** NRR : COMMENTS AND REMARKS ***

THIS RESEARCH PROGRAM HAS HAD RELATIVELY LIMITED SCOPE AND RESOURCES AND CONSEQUENTLY HAS NOT PROVIDED DIRECTLY USABLE NEW PROCEDURES OR METHODS OF QUALIFICATION OF EQUIPMENT. HOWEVER, IT DID SERVE A USEFUL PURPOSE IN IDENTIFYING THE POTENTIAL AREAS NEEDED FOR FURTHER INVESTIGATION WHICH SHOULD BE CONTINUED. BASED ON THE RESEARCH RESULTS, NRR HAS TAKEN THE FOLLOWING ACTIONS: 1) THE IEEE STANDARDS COMMITTEE RESPONSIBLE FOR DEVELOPING EQUIPMENT SEISMIC QUALIFICATION GUIDANCE HAS BEEN INFORMED OF THE RESEARCH RESULTS. INVESTIGATION BY THE COMMITTEE TO DETERMINE IF ANY POSSIBLE REFINEMENT OF CURRENT CRITERIA IS NECESSARY IS UNDERWAY.
2) FURTHER RESEARCH ON THE DAMAGE SEVERITY FACTOR AND THE CRITERIA TO IMPROVE THE FREQUENCY VERSUS ENERGY DISTRIBUTION IN THE TEST INPUT SPECIFICATION CONTINUES TO BE A RECOMMENDATION OF NRR FOR CONSIDERATION BY THE OFFICE OF NUCLEAR REGULATORY RESEARCH.
3) REVIEWERS HAVE BEEN INSTRUCTED OF THE CONTINUED NEED TO MAINTAIN A CAREFUL REVIEW OF ALL TEST INPUT FUNCTIONS USED OR PROPOSED FOR EQUIPMENT QUALIFICATION.

RIL NO: 80-080 **DATE ISSUED**: 01/15/80 **RIL TITLE**: DETERMINING EFFECT OF ALARA DESIGN & OPERATIONAL FEATURES

RESEARCH REVIEW GROUP NO.: 5-23 0-00 **SPONSORING OFFICE(S)**: NRR (76-12)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

DETERMINING EFFECTIVENESS OF ALARA DESIGN AND OPERATIONAL FEATURES

RES COMMENTS

THE PURPOSE OF THIS PROGRAM WAS TO IDENTIFY AND QUANTIFY THE EXPOSURE REDUCTION POTENTIAL OF THE DESIGN AND OPERATIONAL GUIDELINES GIVEN IN REGULATORY GUIDE 8.8 AND TO ASSESS THE COSTS INVOLVED IN IMPLEMENTING THEM. A THREE PART METHODOLOGY WAS DEVELOPED TO ASSESS OCCUPATIONAL EXPOSURE USAGE AT LIGHT WATER REACTORS, TO DETERMINE QUANTITATIVELY THE POTENTIAL FOR RADIATION EXPOSURE REDUCTION, AND TO EVALUATE THE JUSTIFICATIONS FOR MAKING IMPROVEMENTS.

DOCUMENT ISSUED: NUREG/CR-0446.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/15/80 ACTUAL RESP. DATE: 04/28/80 USER OFFICE REVIEWER: W. KREGER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PURPOSE OF THIS RESEARCH WAS TO DEVELOP A METHOD TO QUANTITATIVELY EVALUATE THE USEFULNESS AND EFFECTIVENESS OF THE DESIGN AND OPERATIONAL GUIDELINES GIVEN IN REGULATORY GUIDE 8.8. NRR USED THESE GUIDELINES TO EVALUATE NUCLEAR POWER PLANT APPLICATIONS. THE RESEARCH RESULTED IN THE DEVELOPMENT OF A METHODOLOGY FOR DETERMINING THE EFFECTIVENESS OF ALARA DESIGN AND OPERATIONAL FEATURES FOR LWR'S ON A PLANT BY PLANT BASIS.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS CONFIRM THAT REGULATORY GUIDE 8.8 DOES NOT ADDRESS THE SIGNIFICANT METHODS OF EXPOSURE REDUCTION. THEY DEMONSTRATE THAT IT IS FEASIBLE TO RANK EXPOSURE REDUCTION PROJECTS BY PRIORITY ON AN INDIVIDUAL PLANT BASIS, GIVEN THE PROPER INPUT DATA. THE RESULTS SHOW THAT ALARA PRIORITIES VARY FROM PLANT TO PLANT AND DEPEND ON SUCH THINGS AS DOSE RATES, EXPOSURE RECORDS AND COST OF ACTION. THERE IS NO INTENT THAT THE RESULTS OF THIS RESEARCH BE APPLIED TO THE LICENSING PROCESS ALTHOUGH THE RESULTS MAY BE USEFUL TO INDIVIDUAL PLANTS. THESE RESULTS, HOWEVER, HAVE ADDED TO THE STAFF'S GENERAL UNDERSTANDING OF THE EFFECTIVENESS OF ALARA DESIGN AND OPERATIONAL FEATURES.

*** NRR : COMMENTS AND REMARKS ***

THE METHODOLOGY IS NOT CAPABLE OF PROVIDING AN OVERALL NON-PLANT SPECIFIC RANKING OF THE FEATURES IN REGULATORY GUIDE 8.8. THE RESEARCH SHOWED THAT THE DATA NECESSARY FOR MAKING A COST-BENEFIT ANALYSIS OF ALARA FEATURES DOES NOT CURRENTLY EXIST IN THE INDUSTRY. EVEN IF THIS DATA WERE AVAILABLE, THE MODEL DEVELOPED BY UNI WOULD BE ONLY ONE OF MANY MODELS (E.G., NESP-010, AND NESP-017) AVAILABLE TO PERFORM SUCH A COST-BENEFIT ANALYSIS.

RIL NO: 80-081 DATE ISSUED: 02/28/80 RIL TITLE: IRRADIATED FUEL DISRUPTION UNDER LOF ACCIDENT CONDITIONS

RESEARCH REVIEW GROUP NO.: 2-06 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

IRRADIATED FUEL DISRUPTION UNDER LOF ACCIDENT CONDITIONS: RESULTS OF ACPR TEST SERIES FD-1 AND THE FISGAS CODE

RES COMMENTS

SUMMARIZED IN THIS RIL ARE RESULTS OF THE FUEL DISRUPTION-1 (FD-1) SERIES OF IN-REACTOR EXPERIMENTS ON THE SWELLING AND DISRUPTION OF IRRADIATED FUEL UNDER THE CONDITIONS OF AN UNPROTECTED (NO-SCRAM) LOSS-OF-FLOW (LOF) ACCIDENT IN AN LMFBR. ALSO PRESENTED IS ANALYSIS WITH THE FISGAS IRRADIATED-FUEL FISSION-GAS-BEHAVIOR CODE THAT WAS DEVELOPED FROM THESE RESULTS. IN THE CRBR PSAR, THE APPLICANT INVOKED AN ASSUMED FISSION-GAS-DRIVEN FUEL DISPERSAL AND SWEEP OUT TO ACHIEVE A NON-ENERGETIC TERMINATION OF THE UNPROTECTED LOF ACCIDENT. THIS ASSUMPTION WAS REJECTED BY THE NRR STAFF ON THE BASIS THAT NO BACK-UP DATA WERE AVAILABLE. THE FD-1 SERIES OF EXPERIMENTS AND ANALYSIS WERE UNDERTAKEN TO RESOLVE THIS ISSUE, AND THE RESULTS SUPPORT THE STAFF POSITION. NO EVIDENCE FOR THE HYPOTHESIZED PRE-MELTING FUEL DISPERSAL WAS SEEN, BUT SUBSTANTIAL RAPID SWELLING OF THE TEST FUEL DID OCCUR ON THE APPROACH TO MELTING.

DOCUMENTS ISSUED: NUREG/CR-1124, -0914.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-082 **DATE ISSUED**: 02/29/80 **RIL TITLE**: SOCIAL AND ECONOMIC EFFECTS OF TMI ACCIDENT

RESEARCH REVIEW GROUP NO.: 5-21 0-00 **SPONSORING OFFICE(S)**: NRR (79-12)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B6268	POST-LICENSING		PRICHARD C

RIL SUBJECT/DESCRIPTION

THREE MILE ISLAND TELEPHONE SURVEY: PRELIMINARY REPORT ON PROCEDURES AND FINDINGS, AND THE SOCIAL AND ECONOMIC EFFECTS OF THE ACCIDENT AT THREE MILE ISLAND: FINDINGS TO DATE.

RES COMMENTS

THIS STUDY DEALS WITH THE SOCIAL AND ECONOMIC EFFECTS OF THE ACCIDENT AT THREE MILE ISLAND DURING THE FIRST 6 MONTHS FOLLOWING THE ACCIDENT.

A VARIETY OF DATA SOURCES WERE UTILIZED INCLUDING PUBLISHED DOCUMENTS AND STATISTICS, HOUSEHOLD SURVEYS, NEWSPAPER FILES, INTERVIEWS, AND OTHER RESEARCH ABOUT THE ACCIDENT. THE FINDINGS CAN BE GROUPED INTO EFFECTS ON (1) THE REGIONAL ECONOMY, (2) INSTITUTIONS, AND (3) INDIVIDUALS. DIRECT ECONOMIC EFFECTS DURING THE EMERGENCY PERIOD FOLLOWING THE ACCIDENT WERE INTERRUPTED LOCAL PRODUCTION AND REDUCED LOCAL INCOME AND EMPLOYMENT. LOSSES WERE CONSPICUOUS DURING THE FIRST WEEK OF APRIL BUT SUBSEQUENTLY VERY MINOR. THERE IS NO EVIDENCE OF ANY CONTINUING INTERRUPTION OF ACTIVITY BECAUSE OF THE ACCIDENT. HOWEVER, THERE IS CONCERN WITHIN THE BUSINESS COMMUNITY ABOUT THE EFFECT OF THE ACCIDENT ON THE CONTINUED GROWTH AND DEVELOPMENT OF THE AREA. MAJOR INSTITUTIONAL EFFECTS WERE A STRAIN ON THE EMERGENCY PREPAREDNESS NETWORK IN THE AREA AND AN INCREASED FOCUS ON THE ISSUE OF THE TMI PLANT BY THE LOCAL POPULACE. MAJOR EFFECTS ON INDIVIDUALS WERE THE EVACUATION ITSELF AND INCREASED STRESS DURING THE ACCIDENT PERIOD. FOR MOST PEOPLE, THE EFFECTS OF THE ACCIDENT WERE SHORT-LIVED, BUT FOR OTHERS, THE ACCIDENT HAS CAUSED A MORE PERMANENT CHANGE IN THEIR DAY-TO-DAY ACTIVITIES. IT WILL BE USEFUL TO YOUR STAFF IN LICENSING HEARINGS.

DOCUMENTS ISSUED: NUREG/CR-1215.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 06/29/80 ACTUAL RESP. DATE: 04/03/80 USER OFFICE REVIEWER: M. KALTMAN

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

AS PART OF THE COST-BENEFIT ANALYSIS OF LICENSING APPLICATIONS, THE NRC IS REQUIRED TO ASSESS THE LIKELY SOCIOECONOMIC IMPACTS ASSOCIATED WITH THE CONSTRUCTION AND OPERATION OF NUCLEAR POWER STATIONS ON LOCAL COMMUNITIES AND THE SURROUNDING REGIONS. THE SUBJECT REPORTS ARE AN OUTGROWTH OF CONTRACT NO. NRC-04-78-193, ENTITLED 'POST LICENSING STUDIES OF THE SOCIOECONOMIC IMPACT OF NUCLEAR POWER STATION SITING.' AS DESIGNED, THE CONTRACT REQUIRED ANALYSES AT 14 SITES, ONE OF WHICH WAS THREE MILE ISLAND. THE METHODOLOGY AND CONCLUSIONS OF THE SUBJECT RESEARCH REPORTS INCREASED THE STAFF'S UNDERSTANDING OF THE BEHAVIORAL RESPONSES AND COST OF ACCIDENTS AT NUCLEAR POWER PLANTS.

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH SERVED AS PRIMARY VEHICLES FOR DISCLOSING INFORMATION ON THE ACCIDENT EFFECTS TO THE PUBLIC. THE FINDINGS OF BOTH STUDIES WILL ALSO BE USEFUL IN DELINEATING THE GENERIC SOCIOECONOMIC EFFECTS OF CLASS 9 ACCIDENTS AT REACTORS.

*** NRR : COMMENTS AND REMARKS ***

NONE

RIL NO: 80-083 DATE ISSUED: 03/24/80 RIL TITLE: STEAM GENERATOR TUBE INTEGRITY

RESEARCH REVIEW GROUP NO.: 1-20 0-00 SPONSORING OFFICE(S): NRR (76-03)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B2097	STEAM GENERATOR TUBE INTEGRITY		MUSCARA J

RIL SUBJECT/DESCRIPTION

STEAM GENERATOR TUBE INTEGRITY

RES COMMENTS

THIS RESEARCH INFORMATION LETTER TRANSMITS RESULTS OF COMPLETED RESEARCH DEALING WITH THE INTEGRITY OF ARTIFICALLY DEFECTED INCONEL 600 TUBING TYPICAL OF THAT FOUND IN PRESENT SERVICE IN PRESSURIZED STEAM GENERATORS. MACHINED DEFECTS IN THE FORMS OF SLOTS, ELLIPTICAL WASTAGE, ELLIPTICAL WASTAGE PLUS THROUGH-WALL EDM SLOTS AND UNIFORM THINNING WERE CONTAINED IN TYPICAL PWR STEAM GENERATOR TUBING. BURST TESTS SHOWED THAT THE TWO PRIMARY FACTORS GOVERNING THE BURST PRESSURES FOR THE DEFECTED TUBES IN THIS PROGRAM ARE THE DEFECT DEPTH AND LENGTH; THIS LATTER FACTOR IS SIGNIFICANT BECAUSE CURRENT REGULATIONS DO NOT REQUIRE ASSESSMENT OF DEFECT LENGTH TO JUDGE TUBE INTEGRITY. TUBE COLLAPSE OCCURRED AT PRESSURES CONSIDERABLY HIGHER THAN COULD OCCUR UNDER MOST CREDIBLE ACCIDENT CONDITIONS. THE SINGLE FREQUENCY EDDY CURRENT TUBE INSPECTION METHOD IS CAPABLE OF SIGNIFICANT INACCURACIES IN DEFECT MEASUREMENT AND HAS A LOW PROBABILITY OF DETECTING SMALL VOLUME DEFECTS IN STRAIGHT SECTION TUBES UNDER OPTIMUM TEST CONDITIONS. NEVERTHELESS, BECAUSE OF THE LARGE MARGIN OF SAFETY BUILT INTO THE CHOICE OF STEAM GENERATOR TUBING WALL THICKNESS DIMENSIONS AND THE INHERENT TOUGHNESS OF INCONEL 600 MATERIAL, PRESENT INSPECTION AND PLUGGING CRITERIA APPEAR TO BE CONSERVATIVE.

DOCUMENT ISSUED: NUREG/CR-0718

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 07/24/80 ACTUAL RESP. DATE: 04/25/80 USER OFFICE REVIEWER: B. LIAW

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS PROGRAM DEVELOPED DATA FOR NRR TO EVALUATE STEAM GENERATOR TUBE PLUGGING CRITERIA AND EDDY-CURRENT TESTING PERFORMANCE ON A GENERIC AND PLANT SPECIFIC BASIS. THE RESULTS HAVE BEEN USED IN THE EVALUATION OF MANY OPERATING PLANTS WITH DEGRADED STEAM GENERATORS. THE PROGRAM HAS CONFIRMED THE CONSERVATISM OF CURRENT TUBE PLUGGING CRITERIA AND RESULTS ARE BEING USED AS INPUT TO UNRESOLVED SAFETY ISSUES A-3, A-4, AND A-5, REGARDING STEAM GENERATOR TUBE INTEGRITY. AS PART OF THE UNRESOLVED SAFETY ISSUES, THESE RESULTS MAY BE USED TO DEVELOP MORE DESCRIMINATING TUBE PLUGGING CRITERIA AND REVISE REGULATORY GUIDE 1.21.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THIS PROGRAM HAVE CONFIRMED THE CONSERVATISM OF THE CURRENT CRITERIA FOR PLUGGING STEAM GENERATOR TUBES AND ARE BEING USED TO DEVELOP MORE DESCRIMINATING TUBE PLUGGING CRITERIA IN CONNECTION WITH THE A-3, A-4, AND A-5 ACTIVITIES.

*** NRR : COMMENTS AND REMARKS ***

THIS PROGRAM HAS PROVIDED A SIGNIFICANT CONTRIBUTION IN EVALUATING THE EXTENSIVE DEGRADATION PROBLEMS AFFECTING OPERATING STEAM GENERATORS.

RIL NO: 80-084 **DATE ISSUED**: 03/24/80 **RIL TITLE**: STUDY OF LIQUEFACTION RESULTING FROM EARTHQUAKE, 2/4/76

RESEARCH REVIEW GROUP NO.: 3-02 0-00 **SPONSORING OFFICE(S)**: NRR (79-07)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B7002	SOIL SETTLEMENT		BERATAN L

RIL SUBJECT/DESCRIPTION

STUDY OF LIQUEFACTION RESULTING FROM EARTHQUAKE OF FEBRUARY 4, 1976 NEAR LAKE AMATITLAN, GUATEMALA

RES COMMENTS

THIS RIL TRANSMITS RESULTS OF A STUDY OF SOIL CHARACTERISTICS WHICH RESULTED IN EXTENSIVE SUBSISTENCE DUE TO LIQUEFACTION ALONG THE NORTHEAST SHORE OF LAKE AMATITLAN, GUATEMALA, DURING THE EARTHQUAKE OF FEBRUARY 4, 1976.

THE RESULTS OF THE INVESTIGATION PROVIDE CASE HISTORY IN WHICH FIELD DATA ON SOIL CHARACTERISTICS IN AN EARTHQUAKE-LIQUEFIED ZONE CAN BE CORRELATED WITH FIELD PERFORMANCE, SUPPLEMENTING CASE STUDIES FOR PREDICTING PROBABLE BEHAVIOR AT OTHER SITES. THE RESULTS ALSO TEND TO CORROBORATE CURRENTLY-USED PROCEDURES FOR EVALUATING LIQUEFACTION POTENTIAL, DEPENDING ON THE DEGREE TO WHICH THE IN SITU PROPERTIES OF THE SOIL ARE REPRESENTED BY THE 'UNDISTURBED' SAMPLES EXTRACTED FROM THE DEPOSIT.

THIS STUDY HAS PARTICULAR PERTINENCE TO SITE EVALUATION AND DETERMINATION OF SEISMIC HAZARD. IT SHOULD BE REFERENCED WHENEVER THE DECISIONS ARE REQUIRED UNDER 10 CFR, PART 100, APPENDIX A, SECTION V, PARAGRAPH D(V) CONCERNING UNSTABLE SOILS. USED WITH APPROPRIATE JUDGEMENT, THESE RESULTS WILL AUGMENT THE PRESENTLY AVAILABLE DATA BASE RELATING TO EARTHQUAKE INDUCED LIQUEFACTION AND WILL IMPROVE OUR PREDICTIVE CAPABILITY IN THIS AREA.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 07/24/80 ACTUAL RESP. DATE: 05/08/80 USER OFFICE REVIEWER: R. MINOGUE

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

THE RIL DOCUMENTS A CASE HISTORY OF EARTHQUAKE INDUCED LIQUEFACTION. THE STUDY COMPARES ACTUAL SOIL BEHAVIOR WITH THAT PREDICTED BY EMPIRICAL CURVES. THE CURVES USED ESTIMATE LIQUEFACTION POTENTIAL FROM THE CYCLIC STRESS RATIO AND FROM THE STANDARD PENETRATION RESISTANCE. IT WAS PARTICULARLY IMPORTANT THAT DATA FROM WITHIN AND ADJACENT TO THE LIQUEFACTION ZONES WAS COMPARED. THE EMPIRICAL CURVES MATCHED THE OBSERVED BEHAVIOR VERY WELL. THIS IS ENCOURAGING BUT WE ARE CONCERNED WITH THE UNIQUENESS OF THE SOIL AND GEOLOGY OF THE SITE.

VOLCANIC SEDIMENTS HAVE PARTICLE SHAPES, DENSITIES, STRENGTHS, AND SIZE DISTRIBUTIONS THAT ARE NOT REPRESENTATIVE OF CLASTIC SEDIMENTS AS A WHOLE. ALSO, THE PHYSICAL ENVIRONMENT OF THE SITE IS NOT REPRESENTATIVE OF CONDITIONS TYPICAL OF THE U.S. IT IS A DELTA IN A FRESH WATER LAKE AND THE UNDERLYING STRATA ARE THOUGHT TO HAVE COMPLEX FACIES RELATIONSHIPS.

THE STUDY CONFIRMS AT THE EXTREME END OF THE EMPIRICAL CURVES CURRENTLY USED ANALYSES FOR DETERMINING SOIL LIQUEFACTION POTENTIAL. BECAUSE OF THE UNIQUENESS OF THE SITE, THE STUDY DOES NOT APPLY TO SITING OF NUCLEAR POWER PLANTS IN THE UNITED STATES. BECAUSE OF THE SITE CONDITIONS THIS TYPE OF STUDY MIGHT BETTER HAVE BEEN FUNDED BY NSF.

*** SD : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** SD : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 80-085 **DATE ISSUED**: 03/24/80 **RIL TITLE**: INTEGRATED GEOPHYS. & GEOLOG. STUDY OF TECTONIC WORK

RESEARCH REVIEW GROUP NO.: 3-01 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B5971	NEW MADRID TECTONIC FRAMEWORK		STEUER H

RIL SUBJECT/DESCRIPTION

AN INTEGRATED GEOPHYSICAL AND GEOLOGICAL STUDY OF THE TECTONIC FRAMEWORK OF THE 38TH PARALLEL LINEAMENT - ANNUAL REPORT FT 1979

RES COMMENTS

THIS STUDY IS A PART OF THE 'NEW MADRID SEISMOTECTONIC STUDY' WHICH IS A COORDINATED PROGRAM OF GEOLOGICAL, GEOPHYSICAL, AND SEISMOLOGICAL INVESTIGATIONS OF THE AREA WITHIN A 200-MILE RADIUS OF NEW MADRID, MISSOURI. THE STUDY IS DESIGNED TO DEFINE THE STRUCTURAL SETTING AND TECTONIC HISTORY OF THE AREA IN ORDER TO REALISTICALLY EVALUATE EARTHQUAKE RISKS IN THE SITING OF NUCLEAR FACILITIES. AN IMPORTANT GOAL OF THE RESEARCH PROGRAM IS TO PRODUCE USEFUL SEISMOTECTONIC AND SEISMIC ZONING MAPS FOR THE STUDY AREA.

THE PRINCIPAL PROGRESS IN THIS INTEGRATED STUDY PROGRAM HAS BEEN IN ACQUIRING AND SYNTHESIZING CRITICAL MAGNETIC, GRAVITY, AND GEOLOGIC DATA; CONDUCTING CRUSTAL SEISMIC INVESTIGATIONS; AND IN INTERPRETATION OF THE AVAILABLE DATA.

WHILE THESE INTERIM RESULTS ARE NOT DEFINITIVE, WE RECOMMEND THAT THE CURRENT PRACTICE OF EXTENDING THE NEW MADRID 1811-1812 EARTHQUAKES NORTH OF THE ROUGH CREEK FAULT ZONE (38TH PARALLEL LINEAMENT) BE CONTINUED. IT IS ALSO RECOMMENDED THAT THE INFORMATION IN NUREG/CR-1014 BE CONSIDERED BY THE OFFICE OF STANDARDS DEVELOPMENT AND THE OFFICE OF NUCLEAR REACTOR REGULATION AS INPUT TO THE DEVELOPMENT OF A TECTONIC PROVINCE OR SEISMIC ZONING MAP OF THE EASTERN U.S. AND TO PROVIDE A BASIS AND GUIDE FOR ONGOING STUDIES IN THE AREA.

DOCUMENT ISSUED: NUREG/CR-1014

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-086 **DATE ISSUED**: 04/04/80 **RIL TITLE**: GAS SCINTILLATION COUNTER FOR MEASURING PLUTONIUM

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: IE (76-3)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

GAS SCINTILLATION PROPORTIONAL COUNTER FOR MEASURING PLUTONIUM IN HUMANS AND THE ENVIRONMENT

RES COMMENTS

GAS SCINTILLATION PROPORTIONAL COUNTERS (GSPC) WERE ORIGINALLY DEVELOPED FOR USE IN SPACECRAFT FOR X-RAY ASTRONOMY STUDIES. THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH ON THE USE OF A GSPC FOR MEASURING PLUTONIUM IN HUMANS AND THE ENVIRONMENT.

AFTER TESTING SEVERAL TYPES OF COUNTERS, AN ELECTRON-FOCUSING PROTOTYPE COUNTER WAS BUILT WHICH HAS EXCELLENT RESOLUTION AND IS UNIFORMLY RESPONSIVE OVER THE ENTIRE VOLUME OF THE COUNTER. THE LONG-TERM RELIABILITY OF THE COUNTER WAS CHECKED FOR ONE YEAR AND FOUND TO BE EXCELLENT. THE COUNTER HAS BEEN CALIBRATED FOR MEASURING THE LUNG CONTENT OF 238 PU, 239 PU, AND 241 AM. THE COUNTING EFFICIENCY OF THE COUNTER IS GOOD BUT THE BACKGROUND OF THE COUNTER IS TOO HIGH. A SECOND LOW BACKGROUND PROTOTYPE IS UNDER CONSTRUCTION IN WHICH ULTRA PURE MATERIALS WILL BE USED. UPON COMPLETION, THIS COUNTER SHOULD PROVIDE MUCH GREATER SENSITIVITY FOR IN VIVO MEASURING PLUTONIUM IN THE LUNG.
ORIGINATOR: J. FOULKE, HSWM, RES
DOCUMENT ISSUED: NUREG/CR-1107, 11/79 (FIN B-2091)

OFFICE: IE IMPACT STATEMENT

SCHED. RESP. DATE: 08/04/80 ACTUAL RESP. DATE: 04/15/80 USER OFFICE REVIEWER: J. SNIEZEK

*** IE : APPLICATION TO THE REGULATORY PROCESS ***

THE SUBJECT RESEARCH REPORT OUTLINES THE DEVELOPMENT OF A COUNTER FOR MEASURING PLUTONIUM IN VIVO IN HUMANS AT AN IMPROVED LEVEL OF EFFICIENCY. INCREASED EFFICIENCY WOULD PERMIT DETECTION AND QUANTIFICATION OF SMALLER QUANTITIES OF PLUTONIUM AND THUS BE USEFUL FOR EVALUATION OF LOW LEVELS OF HUMAN DEPOSITION AND ENVIRONMENTAL CONTAMINATION.

IT IS OUR UNDERSTANDING THAT THE DOE HAS UNDER REVIEW A PROPOSAL FOR CONTINUING DEVELOPMENT OF THIS COUNTER. IF THE DOE DOES NOT FUND THIS PROJECT FOR THE NEXT YEAR, WE RECOMMEND THAT NRC CONSIDER FUNDING RESEARCH INTO THE FIELD APPLICATIONS OF THE COUNTER.

*** IE : IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** IE : COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

RIL NO: 80-087 DATE ISSUED: 04/24/80 RIL TITLE: ECON. MODEL FOR DISAGGREGATION OF STATE-LEVEL ELECTRICITY

RESEARCH REVIEW GROUP NO.: 5-21 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B0190	FORECASTING ELEC DEMAND BY STATES IN U.S.		PRICH/STEWART

RIL SUBJECT/DESCRIPTION

ECONOMETRIC MODEL FOR THE DISAGGREGATION OF STATE-LEVEL ELECTRICITY DEMAND FORECASTS TO THE SERVICE AREA

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH TO DEVELOP A MODELING CAPABILITY FOR INDEPENDENT ASSESSMENT OF NEED FOR POWER ESTIMATES FOR UTILITY SERVICE AREAS AS REQUIRED BY NEPA IN THE LICENSING PROCESS FOR NUCLEAR POWER STATIONS.

THE SLED (STATE-LEVEL ELECTRICITY DEMAND) MODEL, DEVELOPED BY OAK RIDGE NATIONAL LABORATORIES, WAS USED AS THE BASE FOR OBTAINING PROJECTIONS OF STATE LEVEL ELECTRICITY DEMAND. THE SLED MODEL IS A THREE SECTOR (RESIDENTIAL, COMMERCIAL, INDUSTRIAL) MODELING SYSTEM IN WHICH DEMAND FOR ELECTRICITY IS DEFINED AS A FUNCTION OF ELECTRICITY PRICE, PRICES OF ALTERNATIVE FUELS, INCOME, NUMBER OF ELECTRICITY CUSTOMERS, AND HEATING AND COOLING DEGREE DAYS IN THE CASE OF THE RESIDENTIAL SECTOR; ELECTRICITY PRICE, PRICES OF ALTERNATIVE FUELS, INCOME, POPULATION, AND HEATING AND COOLING DEGREE DAYS IN THE CASE OF THE COMMERCIAL SECTOR; AND VALUE ADDED IN MANUFACTURING, THE PRICE OF ELECTRICITY, AND PRICES OF ALTERNATIVE FUELS IN THE CASE OF THE INDUSTRIAL SECTOR. THE MODEL HAS BEEN USED TO PRODUCE FORECASTS FOR 48 STATES THROUGH THE YEAR 2000. IT HAS RECEIVED FAVORABLE ACADEMIC REVIEW, AND HAS PERFORMED RELATIVELY WELL IN LIMITED OUT-OF-SAMPLE PERIOD FORECASTING.

THE MODEL WAS ESTIMATED AND USED TO FORECAST ELECTRICITY DEMAND FOR SIX SERVICE AREAS; CONSOLIDATED EDISON, CENTRAL HUDSON GAS AND ELECTRIC (NEW YORK), COMMONWEALTH EDISON (ILLINOIS), SAN DIEGO GAS AND ELECTRIC (CALIFORNIA), CAROLINA POWER AND LIGHT (NORTH CAROLINA), AND DETRIOT EDISON (MICHIGAN) IN FIVE STATES. THE ESTIMATION PERIOD WAS 1960-1974 FOR MOST SERVICE AREAS WITH ANNUAL DATA BEING USED.

AS A RESULT OF THIS STUDY, AN EFFECTIVE METHOD OF DISAGGREGATING STATE-LEVEL ELECTRICITY DEMAND FORECASTS TO UTILITY SERVICE AREA FORECASTS HAS BEEN DEVELOPED. THIS CAPABILITY WILL ENABLE NRC TO MAKE AN INDEPENDENT EVALUATION OF OTHER FORECASTS OF UTILITY SERVICE AREA ELECTRICITY DEMAND. WE RECOMMEND THAT YOUR STAFF USE THIS METHOD AS PART OF ITS ASSESSMENT OF THE NEED FOR POWER REQUIREMENTS CALLED FOR BY NEPA AS PART OF THE LICENSING PROCESS.

DOCUMENT ISSUED: NUREG/CR-1147, 2/80

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-088 **DATE ISSUED**: 04/25/80 **RIL TITLE**: DES. CRITERIA FOR CLOSELY-SPACED NOZZLES IN PRESSURE VESSELS

RESEARCH REVIEW GROUP NO.: 1-20 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

DESIGN CRITERIA FOR CLOSELY-SPACED NOZZLES IN PRESSURE VESSELS

RES COMMENTS

THE INFORMATION IN THIS RIL DEALS WITH THE DEVELOPMENT OF MORE ACCURATE RULES FOR THE DESIGN OF NOZZLES IN PRESSURE VESSELS AND BRANCH CONNECTIONS IN PIPING FOR NUCLEAR POWER REACTORS THAN ARE PRESENTLY AVAILABLE IN THE ASME BOILER AND PRESSURE VESSEL CODE, SECTION III. THE PRESENT RULES WERE DEVELOPED OVER A LONG PERIOD OF TIME, BASED MAINLY ON EXPERIENCE AND DEMONSTRATED TRIAL AND ERROR PROCEDURES IN NONNUCLEAR APPLICATIONS. THE ADVENT OF MODERN FINITE ELEMENT COMPUTER CODE CALCULATIONAL PROCEDURES HAS ENABLED US TO DEVELOP A NEW RATIONAL BASIS FOR THE DESIGN OF SUCH COMPONENTS. THESE CALCULATIONAL PROCEDURES, COUPLED WITH THE RELATIVELY MODEST EXPERIMENTAL DATA AVAILABLE, HAS ALSO ALLOWED US TO DETERMINE THE DEGREES OF CONSERVATISM (OR UNCONSERVATISM) INHERENT IN THE PRESENT RULES, AS APPLIED TO THE ACTUAL STRESS LEVELS INDUCED IN THE STRUCTURES UNDER REVIEW. THIS WORK WAS DONE OVER A 3-YEAR PERIOD AND HAS RESULTED IN THE DEVELOPMENT OF PROPOSED NEW DESIGN RULES WHICH HAVE BEEN SUBMITTED TO THE ASME FOR INCLUSION (OR REPLACEMENT) OF THE CURRENT APPLICABLE PARAGRAPHS IN SECTION III.

IN GENERAL, THIS WORK HAS SHOWN THAT THE PRESENTLY APPLIED DESIGN RULES HAVE, IN THE MOST PART, BEEN OVERCONSERVATIVE, I.E., REQUIRING MORE MATERIAL THAN NEEDED TO MAINTAIN REQUIRED STRESS LEVELS. FURTHER, IN THE FEW CASES WHERE THE PRESENT DESIGN RULES LEAD TO SLIGHTLY UNCONSERVATIVE DESIGN, THE RESULTANT MODEST DECREASE IN THE ALREADY SIGNIFICANT SAFETY FACTORS DOES NOT COMPROMISE THE SAFETY OF THE STRUCTURES IN QUESTION. THUS, NO REEXAMINATION OF MODIFICATION OF EXISTING STRUCTURES IS CALLED FOR.
DOCUMENTS ISSUED: NUREG/CR-011232, -0507, -0778, -0506 (FIN B-0123)
ORIGINATOR: M. VAGINS

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-089 DATE ISSUED: 05/11/80 RIL TITLE: STRUCTURAL AND MECHANICAL COMPONENT TEST TECHNIQUES

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR (77-18)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

STRUCTURAL AND MECHANICAL COMPONENT TEST TECHNIQUES

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF STUDIES WHICH EXPLORE AND INVESTIGATE THE FEASIBILITY, COSTS, BENEFITS, RELIABILITY, LIMITATIONS AND POTENTIAL PLANT DEGRADATION ASSOCIATED WITH CONFIRMATORY IN SITU DYNAMIC TESTING UTILIZING VARIOUS MEANS OF EXCITING VIBRATIONS IN SAFETY-RELATED STRUCTURES AND MECHANICAL EQUIPMENT.
DOCUMENTS ISSUED: NUREG/CR-1431, -1442, -1443 (FIN A-0128)
ORIGINATOR: J. O'BRIEN, RES

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/11/80 ACTUAL RESP. DATE: 05/11/80 USER OFFICE REVIEWER: T. CHENG

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RESEARCH CONSISTED OF A REVIEW BY LLNL OF IN-SITU DYNAMIC TESTING EXPERIMENTS IN FULL SCALE NUCLEAR POWEWR PLANTS. STRUCTURES TESTED WERE PIPING SYSTEMS, CONTAINMENT BUILDINGS, STORAGE TANKS, HEAT EXCHANGERS, GAS STORAGE VESSELS, AND CERTAIN VALVES. THE OBJECTIVES OF THE REVIEW WERE TO EXPLORE AND INVESTIGATE THE FEASIBILITY OF THE TESTING TECHNIQUES OBSERVED FROM THE STANDPOINT OF BENEFITS, COSTS, RELIABILITY, LIMITATIONS, AND POTENTIAL PLANT DEGRADATION. THE TEST METHODS EVALUATED INCLUDD SNAP-BACK EXPERIMENTS, PULSE GENERATORS, BURIED EXPLOSIVES, SINUSOIDAL VIBRATIONS AND SHAKERS. POTENTIAL BENEFITS FROM SUCH TESTING INCLUDE CONFIRMATION OF DESIGN MODELS AND CODES, ASSESSMENT OF DYNAMIC PARAMETERS (PARTICULARLY DAMPING), AND THE DETECTION OF CONSTRUCTION ERRORS AND STRUCUTURAL DEGRADATION. DYNAMIC TESTING OF DECOMMISSIONED PLANTS COULD BE USED TO ESTABLISH FRAGILITY LEVELS.

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH IDENTIFIED DYNAMIC TESTING ON 18 NUCLEAR POWER PLANTS, INCLUDING THE FOLLOWING 6 PLANTS IN THE U.S: DIABLO CANYON, INDIAN POINT UNITS 1 AND 2, HUMBOLDT BAY, SAN ONOFRE UNIT 1, AND QUAD CITIES. FURTHER STUDIES ARE NECESSARY TO ATTAIN COMPLETION OF THE RESEARCH OBJECV CTIVES AND TO DETERMINE THE EXTENT TO WHICH CONFIRMATORY IN SITU DYNAMIC TESTING SHOULD BE INTEGRATED INTO NRC LICENSING PRACTICE. SUBSTANTIAL INFORMATION ABOUT DYNAMIC BEHAVIOR HAS BEEN OBTAINED FROM THESE TESTS BUT THEIR IMPACT ON LICENSING REVIEWS REQUIRES INTERPRETATION OF THE DATA IN CONJUNCTION WITH SPECIFIC PLANT REVIEWS OR IN THE VERIFICATION OF BENCH-MARKING OF ANALYTICAL MODESLLS. IF FULL DETAILS CAN BE OBTAINED ON THE FOREIGN TESTS (FIVE IN JAPAN, THREE IN GERMANY, TWO IN ITALY AND TWO IN INDIA), THESE DATA WOULD BE OF GENERAL USE AND OF USE IN SUPPORTING COMPUTER ANALYTICAL METHODS.

*** NRR : COMMENTS AND REMARKS ***

1. IN-SITU DYNAMIC TESTING HAS THE POTENTIAL FOR PROVIDING VL VALUABLE INFORMATION FOR THE ASSESSMENT AND VERIFICATION OF STRUCTURAL DESIGNS FOR EITHER NEW PLANTS OR OPERATING PLANTS.
2. IN VIEW OF THE RELATIVELY LOW LEVEL OF EXCITATION USUALLY EMPLOYED FOR IN-SITU DYNAMIC TESTING, SUCH TESTING METHODS ARE NOT EXPECTED TO DEVELOP INTO A FEASIBLE MEANS FOR THE SEISMIC QUALIFICATION OF EQUIPMENT IN OPERATING PLANTS THAT MUST PERFORM AT SSE AND OBE LEVELS OF EXCITATION.

RIL NO: 80-090 **DATE ISSUED**: 05/22/80 **RIL TITLE**: RELAP-4/MOD6 ASSESSMENT

RESEARCH REVIEW GROUP NO.: 1-17 0-00 **SPONSORING OFFICE(S)**: NRR (77-5)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

RELAP-4/MOD6 ASSESSMENT

RES COMMENTS

RESULTS OF INDEPENDENT ASSESSMENT OF THE RELAP-4/MOD6 CODE ARE PRESENTED, TOGETHER WITH A SUMMARY OF THE PWR LARGE BREAK LOCA UNCERTAINTY STUDY, LIMITED TO THE BLOWDOWN REGIME OF LOCA. THE CODE WAS FOUND TO HAVE ADEQUATE TREATMENT OF THERMAL-HYDRAULICS DURING THE BLOWDOWN PERIOD OF LOCA. ITS PERFORMANCE WAS SPOTTY DURING THE REFLOOD PERIOD AND INADEQUATE DURING THE REFILL STAGE. THE CODE OR MODEL INPUT PARAMETERS FOUND TO HAVE THE STRONGEST EFFECT ON THE PEAK CLAD TEMPERATURE DURING THE BLOWDOWN STAGE OF LOCA COMPRISED POWER PEAKING FACTORS, FUEL GAP CONDUCTANCE, THERMAL CONDUCTIVITY OF FUEL PELLETS, AND THE INITIAL POWER. DOCUMENT ISSUED: NUREG/CR=0940.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 10/06/81 USER OFFICE REVIEWER: E.THROM/J.WATT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RIL DESCRIBES THE RES-SPONSORED INDEENDENT ASSESSMENT OF THE LOCA CODE RELAP-4/MOD 6. AS THE FIRST BEST ESTIMATE CODE SO ASSESSED, IT WAS THOUGHT USEFUL TO DOCUMENT THE ASSESSMENT METHODOLOGY AND THE EXPERIENCE OF APPLICATION. WHILE SUPPORTIVE AND PROVIDING ENLIGHTENMENT, THERE IS NOT DIRECT APPLICATION TO LICENSING. THE ASSESSMENT PROVIDES A COMPARISON OF PREDICTED VERSUS EXPERIMENTAL INFORMATION. CODE STRENGTHS AND WEAKNESSES ARE THUS IDENTIFIED AND EVALUATEDD FOR CONSIDERATION IN THE DEVELOPMENT OF ADVANCED CODES

*** NRR : IMPACT OF RESULTS ***

THE ASSESSMENT PROVIDES A COMPARISON OF PREDICTED VERSUS EXPERIMENTAL INFORMATION. CODE STRENGTH AND WEAKNESS ARE THUS IDENTIFIED AND EVALUATED FOR CONSIDERATAION IN THE DEVELOPMENT OF ADVANCED CODES.

*** NRR : COMMENTS AND REMARKS ***

A GENERAL ASSESSMENT METHODOLOGY HAS BEEN CONFIRMED. RELAP-4/MOD 6 WAS SELECTED BECAUSE OF ITS AVAILABILITY FOR ASSESSMENT RATHER THAN ITS CAPABILITY. THE EVALUATION EXPERIENCE IS TO BE UTILIZED IN THE ASSESSMENT OF THE ADVANCED BEST ESTIMATAE CODE TRAC.

RIL NO: 80-091 **DATE ISSUED**: 06/02/80 **RIL TITLE**: ACPR EXPERIMENTS ON PROMPT-BURST ENERGETICS

RESEARCH REVIEW GROUP NO.: 2-06 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A1016	ACCIDENT ENERGETICS		WRIGHT R

RIL SUBJECT/DESCRIPTION

ACPR EXPERIMENTS ON PROMPT-BURST ENERGETICS WITH FRESH URANIUM CARBIDE FUEL

RES COMMENTS

THIS RIL DESCRIBES THE RESULTS AND ANALYSIS OF A SERIES OF THREE SINGLE-PIN EXPERIMENTS IN THE ACPR TEST REACTOR ON THE PRESSURES GENERATED AND THE WORK POTENTIAL RESULTING FROM THE FAILURE OF FRESH URANIUM-CARBIDE FUEL PINS IN SODIUM UNDER PROMPT-BURST DISASSEMBLY CONDITIONS IN AN LMFBR. POST-FUEL-FAILURE THERMAL INTERACTIONS BETWEEN THE MOLTEN FUEL AND COOLANT PRODUCED SHARP, SHORT, VERY-HIGH PRESSURE PULSES OF UP TO 130 MPA SOURCE PRESSURE, BUT THE CONVERSION RATIOS OF FUEL THERMAL ENERGY INTO MECHANICAL WORK WERE ALL LESS THAN 2%. BOTH THESE VALUES ARE ABOUT A FACTOR OF 5 GREATER THAN IN CORRESPONDING EXPERIMENTS WITH FRESH OXIDE FUEL. CERTAIN FEATURES OF THE RESULTS ARE IN ACCORD WITH THE THERMAL DETONATION MODEL OF MOLTEN-FUEL-COOLANT INTERACTIONS DEVELOPED BY BOARD AND HALL. A DEVELOPMENT OF THE EXPAND MODEL FOR THE FAILURE OF FRESH FUEL IN POWER EXCURSIONS GIVES EXCELLENT AGREEMENT WITH THE MEASURED FUEL-FAILURE TIMES AND ENERGY DEPOSITIONS. THIS RESEARCH WAS A JOINT PROGRAM BETWEEN SANDIA LABORATORIES, AS CONTRACTOR FOR NRC, AND KERNFORCHUNGSZENTRUM KARLSRUHE (KFK) OF THE FEDERAL REPUBLIC OF GERMANY.
DOCUMENT ISSUED: NUREG/CR-1396

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-092 **DATE ISSUED**: 06/18/80 **RIL TITLE**: TRAC-PIA

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR (77-5)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

TRAC-PIA

RES COMMENTS

THIS RIL DESCRIBES THE FIRST RELEASED VERSION OF THE BEST-ESTIMATE TRAC COMPUTER CODE, TRAC-PIA. THE NEED FOR A BEST-ESTIMATE CODE IS DOCUMENTED, AS WELL AS BRIEF COMPARISONS OF TRAC-PIA WITH RELAP-4 AND WITH FUTURE TRAC CODE VERSIONS. THERE IS A DISCUSSION OF TRAC-PIA PREDICTIVE CAPABILITIES FOR LOCA GIVEN, COVERING BOTH HYDRODYNAMICS AND HEAT TRANSFER FOLLOWED BY A DISCUSSION OF NEEDS FOR IMPROVEMENT IN FUTURE TRAC VERSIONS. RECOMMENDATIONS FOR THE USE OF TRAC-PIA IN ANALYZING LWR BEHAVIOR ARE GIVEN, BASED ON USER EXPERIENCE OVER THE PAST YEAR. TWO APPENDICES PROVIDE A DESCRIPTION OF TRAC-PIA CAPABILITIES AND A SUMMARY OF ITS USE TO ANALYZE DATA IN A VARIETY OF TEST FACILITIES UNDER THE DEVELOPMENTAL ASSESSMENT TASK.
ORIGINATOR: L. SHOTKIN; DOCUMENT ISSUED: NUREG/CR1059 (FIN A7016)

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/04/81 ACTUAL RESP. DATE: 03/04/81 USER OFFICE REVIEWER: W. JENSEN/J. WATT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

A BEST ESTIMATE (BE) DIGITAL COMPUTER CODE, IT WAS DEVELOPED FOR USE IN THE ANALYSIS OF TRANSIENTS AND ACCIDENTS. PROPOSED APPLICATIONS INCLUDE:

1. IDENTIFY THE MARGIN BETWEEN "CONSERVATIVE" AND "BE" ANALYSIS.
2. PREDICTION AND REANALYSIS OF SCALED EXPERIMENTS.
3. REALISTIC PREDICTIONS OF FULL SCALE PLANT CHARACTERISTICS.

*** NRR : IMPACT OF RESULTS ***

THIS CODE HAS HAD ONLY LIMITED APPLICATION TO PLANT LICENSING ACTIONS. LASL USED THE CODE IN ANALYZING THE TMI-2 ACCIDENT IN SUPPORT OF THE LICENSING STAFF. VARIOUS NATIONAL LABORATORIES AND INDUSTRIAL ORGANIZATIONS HAVE USED THE CODE IN THE PREDICTION AND ANALYSIS OF EXPERIMENTS.

*** NRR : COMMENTS AND REMARKS ***

MAJOR PROCESSES WHICH TRAC-P1A CAN CALCULATE INCLUDE BLOWDOWN, CHOKED FLOW IN PIPE, ECCS BYPASS, LOWER PLENUM REFILL, AND REFLOODING OF THE CORE. THE CODE IS BEING APPLIED BY MANY ORGANIZATIONS TO EXPERIMENTAL PROGRAMS. THE RESULTS OF COMPARISONS AND OF SUBSEQUENT CODE DEVELOPMENT WILL BE REPORTED LATER.

RUNNING TIME IS CONSIDERED EXCESSIVE FOR MANY APPLICATIONS. IN THE ABSENCE OF KINETICS FEEDBACK IN THIS VERSION, TRAC-P1A CANNOT NOW BE USED FOR ATWS AND RIA EVENTS. THE ACCURACY OF NATURAL CIRCULATION PREDICTIONS IS SUBJECT TO COMPARISON WITH EXPERIMENTAL DATA.

RIL NO: 80-093 DATE ISSUED: 08/05/80 RIL TITLE: "ISEM" ADVERSARY SEQUENCE EVALUATION

RESEARCH REVIEW GROUP NO.: 4-01 0-00 SPONSORING OFFICE(S): NMSS (77-1)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A0115	EFFECTIVENESS EVALUATION METHODS FOR FIXED-SITE MC&A		FRATTALI S

RIL SUBJECT/DESCRIPTION

"ISEM" ADVERSARY SEQUENCE EVALUATION

RES COMMENTS

AS NOTED IN RIL NO. 93, ISEM IS A FIRST-GENERATED MODEL RECOMMENDED FOR USE UNTIL SECOND-GENERATION MODELS ARE TESTED AND APPROVED. MEMBERS OF THE NMSS SAFEGUARDS STAFF WERE TRAINED IN THE USE OF ISEM IN APRIL 1978. SINCE THEN, MANY CONCEPTS EMBODIED IN ISEM HAVE BEEN INCORPORATED BY RES INTO THE SECOND GENERATION MODELS SAFE AND SNAP (SAFEGUARDS AUTOMATED FACILITY EVALUATION AND SAFEGUARDS NETWORK ANALYSIS PROCEDURE, RESPECTIVELY). THESE SECOND GENERATION MODELS ARE CURRENTLY BEING EVALUATED FOR USER SUITABILITY WITHIN THE DIVISION OF SAFEGUARDS IN SUPPORT OF A PROGRAM OF VULNERABILITY ASSESSMENTS AT LICENSED POWER PLANTS AND FUEL FACILITIES.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-094 **DATE ISSUED**: 08/05/80 **RIL TITLE**: FIXED SITE NEUTRALIZATION MODEL

RESEARCH REVIEW GROUP NO.: 4-01 0-00 **SPONSORING OFFICE(S)**: NMSS (77-1)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A1060	EFFECTIVENESS EVAL METHODS FOR FIXED SITE PHYS PROT		ENNIS

RIL SUBJECT/DESCRIPTION

FIXED SITE NEUTRALIZATION MODEL

RES COMMENTS

THIS RIL TRANSMITS DOCUMENTATION OF COMPLETED RESEARCH ON PHASE I OF THE FIXED SITE NEUTRALIZATION MODEL (FSNM) AND CONSTITUTES A PART OF A CONTINUING NRC RESEARCH PROJECT ENTITLED, "EFFECTIVENESS EVALUATION METHODS FOR FIXED SITE PHYSICAL PROTECTION". THE PRIMARY PRODUCT OF PHASE I IS THE DOCUMENTATION OF THE FIRST VERSION OF A COMPUTER PROGRAM WHICH HAS THE CAPABILITY TO SIMULATE IN GREAT DETAIL AN ENGAGEMENT BETWEEN GUARDS AND ADVERSARIES AT A NUCLEAR FACILITY.

AS NOTED IN RIL NO. 94, ALTHOUGH WORK ON THE FSNM WAS CURTAILED BEFORE COMPLETION, THE EXPERIENCE GAINED FROM ITS DEVELOPMENT WAS USED BY RESEARCH CONTRACTORS TO IMPROVE CREDIBILITY AND ACCEPTANCE OF A DIFFERENT ENGAGEMENT MODEL. THIS OTHER MODEL, CALLED BATLE (BRIEF ADVERSARY THREAT LOSS ESTIMATOR) WAS CREATED TO BE MORE COMPATIBLE WITH EXISTING EVALUATION TOOLS AND MORE COMPUTATIONALLY EFFICIENT.

WE CONSIDER THE WORK, ON DEVELOPMENT OF THE FSNM MODEL, REPORTED IN RIL NO. 94 TO BE EXPLORATORY IN NATURE, CONTRIBUTING PRINCIPALLY TO DEVELOPMENT OF A DIFFERENT ENGAGEMENT MODEL (SUCH AS BATLE) WHICH MAY PROVE MORE PRACTICAL AS A TOOL FOR USE BY THE SAFEGUARDS REGULATORY STAFF. CONSISTENT WITH YOUR RECOMMENDATION IN RIL NO. 94, WE THEREFORE DO NOT INTEND TO USE THE FSNM MODEL IN ANY REGULATORY APPLICATION AT THIS TIME.
DOCUMENTS ISSUED: NUREG/CR-1307, -1308, -0787.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-095 **DATE ISSUED**: 08/05/80 **RIL TITLE**: POSITRON ANNIHILATION FOR NON-DESTRUCTIVE EXAMINATION

RESEARCH REVIEW GROUP NO.: 2-04 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

POSITRON ANNIHILATION FOR NON-DESTRUCTIVE EXAMINATION

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH ON THE ABILITY OF POSITRON ANNIHILATION (PA) TO MEASURE "DAMAGE" QUANTITATIVELY IN METALS. NUREG/CR-1129 (MARCH 1980) DOCUMENTS THE PA TECHNIQUES, QUANTIFIES THE SENSITIVITY, PROVIDES A GOOD BASIS FOR ASSESSING PA AS AN ENGINEERING TOOL, AND SHOWS THAT IT IS NOT APPLICABLE TO STAINLESS STEELS FOR THE OPERATING TEMPERATURE RANGE OF BREEDER REACTORS.
FIN A1172
ORIGINATOR: T. WALKER,RSR, RES

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-096 **DATE ISSUED**: 08/08/80 **RIL TITLE**: ADEQUACY OF CURRENTLY UTILIZED RADIATION TEST SOURCES.

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR (RR SD-77-7)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

ADEQUACY OF CURRENTLY UTILIZED RADIATION TEST SOURCES TO SIMULATE THE LOSS OF COOLANT DESIGN BASIS ACCIDENT

RES COMMENTS

THIS RIL CONSISTS OF A SUMMARY OF THE RESULTS OF A COMPLETED PORTION OF THE QUALIFICATION TESTING EVALUATION PROGRAM RELATING TO THE ADEQUACY OF CURRENTLY UTILIZED RADIATION SIMULATORS TO CONDUCT RADIATION QUALIFICATION OF SAFETY-RELATED EQUIPMENT. THE RESEARCH INCLUDES THE DEVELOPMENT OF A CALCULATIONAL METHOD FOR DETERMINING THE RADIATION MAGNITUDE, SPECTRA, AND PARTICLE TYPE AS A FUNCTION OF TIME THAT WOULD RESULT FROM THE LOCA ASSUMPTIONS DEFINED IN R.G. 1.89. IN ADDITION, SCOPING RADIATION DOSE RATE CALCULATIONS HAVE BEEN MADE FOR A TYPICAL EMPTY CONTAINMENT STRUCTURE. ALSO, DEPTH-DOSE PROFILES FOR A POLYMERIC MATERIAL WERE CALCULATED FOR THE LOCA ASSUMPTIONS, AND A MATERIAL DAMAGE ASSESSMENT WAS MADE FOR A POLYMERIC MATERIAL TO COMPARE THE R.G. LOCA SOURCE TERM AND THE COMMONLY USED TEST SOURCE TERM (COBALT-60).
DOCUMENT ISSUEDD: NUREG/CR-1184
ORIGINATOR: R. FEIT, RSR, RES

BEST DOCUMENT AVAILABLE

168

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/03/81 ACTUAL RESP. DATE: 04/03/81 USER OFFICE REVIEWER: P. DIBENEDETTO

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RESEARCH IS BEING CONDUCTED TO DETERMINE THE ADEQUACY OF RADIATION SIMULATORS CURRENTLY USED IN THE LOCA DESIGN BASIS ACCIDENT QUALIFICATION OF SAFETY-RELATED EQUIPMENT. (RESEARCH REQUEST SD-77-7, FIN #A1051)

*** NRR : IMPACT OF RESULTS ***

BECAUSE OF THE INCONCLUSIVE NATURE OF THE RESULTS TO DATE, THIS RESEARCH HAS NOT YET IMPACTED THE REGULATORY PROCESS.

*** NRR : COMMENTS AND REMARKS ***

THE FOLLOWING ADDITIONAL RESEARCH IS RECOMMENDED:

A. BEST-ESTIMATE CALCULATIONS ARE BEING PERFORMED TO ESTABLISH A MORE REALISTIC LOCA QUALIFICATION SOURCE TERM.
B. TESTS WILL BE CONDUCTED TO COMPARE THE DAMAGE CAUSED BY BETA AND GAMMA RADIATION ON GENERIC CABLE DESIGNS. INCLUDED IN THIS AREA OF RESEARCH WILL BE AN EVALUATION OF THE SECONDARY (BREMSSTRAHLUNG) RADIATION EFFECTS ON INSTRUMENTS WITH PROTECTIVE COVERS THAT WOULD BE PROTECTED FROM THE DIRECT BETA RADIATION, BUT NOT THE SECONDARY X-RAYS.
C. LOCA TESTS MAY BE CONDUCTED WITH MATERIALS AND COMPONENTS IN TYPICAL SAFETY-RELATED CIRCUITS TO DETERMINE THE SIGNIFICANCE OF RADIATION-INDUCED NOISE.

THE RESEARCH RESULTS TO DATE DO NOT CONTAIN INFORMATION THAT SHOULD BE CONSIDERED FOR BOARD NOTIFICATION.

RIL NO: 80-097 **DATE ISSUED**: 08/18/80 **RIL TITLE**: AN ECONOMETRIC STUDY OF ELECTRICITY DEMAND

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR (77-01)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B0190	FORECASTING ELEC DEMAND BY STATES IN U.S.		PRICH/STEWART

RIL SUBJECT/DESCRIPTION

AN ECONOMETRIC STUDY OF ELECTRICITY DEMAND BY MANUFACTURING INDUSTRIES

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH ON ELECTRICITY DEMAND IN THE U.S. ORIGINATING IN THE MANUFACTURING SECTOR OF THE ECONOMY. THE RESEARCH DESCRIBED IN THE NUREG/CR-1135 WILL BE USED IN THE DEVELOPMENT OF THE SLED (STATE LEVEL ELECTRICITY DEMAND) MODEL USED TO ASSESS FORECASTS OF TOTAL ELECTRICITY DEMAND BY STATE.
ORIGINATOR: C. PRICHARD, HSWM, RES.

***** NO OFFICE IMPACT STATEMENTS *****

170

RIL NO: 80-098 DATE ISSUED: 08/18/80 RIL TITLE: LWR STATUS MONITORING DURING ACCIDENT CONDITIONS.

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A6294	PLANT STATUS MONITORING		DISALVO R

RIL SUBJECT/DESCRIPTION

LIGHT WATER REACTOR STATUS MONITORING DURING ACCIDENT CONDITIONS.

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESERCH DESCRIBING AN IMPROVED METHOD FOR ANALYZING OPERATOR RESPONSE DURING ACCIDENT SEQUENCES. THE METHOD IS DEMONSTRATED BY APPLYING IT TO DETERMINE THE OPERATOR'S INFORMATION NEEDS DURING ACCIDENTS (NUREG/CR-1440). THE RIL CONFIRMS THE ADEQUACY OF THE PWR INSTRUMENTATION REQUIREMENTS IN RRREG GUIDE 1.97 AND MAKES THE FOLLOWING RECOMMENDATIONS:
1. THE REGULATORY AND STANDARDS DEVELOPMENTS STAFFS SHOULD REVIEW THE CONCEPTS AND TECHNICAL APPROACH DESCRIBED IN NUREG-1440 AND ADVISE THE RESEARCH STAFF AS TO THE VALUE AND VALIDITY OF THESE TECHNIQUES, AREAS FOR THEIR IMPROVEMENT, AND SUGGESTED TOPICS FOR THEIR APPLICATION. ASSUMING THE METHODS ARE DEEMED PROMISING, THE REGULATORY SAFSTAFF MAY ALSO WANT TO ENCOURAGE LICENSEES AND APPLICANTS TO APPLY THEM TO THEIR OWN FACILITIES. 2. THE REGULATORY AND STANDARDS DEVELOPMENT STAFFS SHOULD REVIEW THESE RESULTS AND ASSIMILATE THEM INTO THE TECHNICAL BASIS FOR DECISIONS RELATIVE TO THE REVISION OF REG GUIDE 1.97. APPROPRIATE CONSIDERATIONS SHOULD BE GIVEN TO THE LIMITATIONS OF THE STUDY WHICH GENERATED THE RESULTS.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/17/81 ACTUAL RESP. DATE: 04/17/81 USER OFFICE REVIEWER: J. WATT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

(LWR STATUS MONITORING DURING ACCIDENT CONDITIONS)
A DRAFT OF NUREG/CR-1440 WAS REVIEWED BY INDUSTRY AND NRC PARTICIPANTS IN DRAFTING REVISION 2 TO REGULATORY GUIDE 1.97 "INSTRUMENTATION FOR LIGHT-WATER-COOLED NUCLEAR POWER PLANTS TO ASSESS PLANT AND ENVIRONMENT CONDITIONS DURING AND FOLLOWING AN ACCIDENT.

*** NRR : IMPACT OF RESULTS ***

NEW VARIABLES IDENTIFIED DURING THE SEQUENCE EVALUATIONS, WERE ADDED TO THE INSTRUMENTATION LISTS OF REGULATORY GUIDE 1.97 REVISION 2.

*** NRR : COMMENTS AND REMARKS ***

SOME ADDITIONAL VARIABLES WERE ADDED ON THE RESULT OF THE SEQUENCE STUDIES. THE RIL DOCUMENTS WORK DONE IN SUPPORT OF THE REGULATORY GUIDE DEVELOPMENT. THE PROGRAM WAS COMPLETED WITH THE PUBLISHING OF NUREG/CR-1440.

RIL NO: 80-099 **DATE ISSUED**: 08/01/80 **RIL TITLE**: DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE.

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR (78-5)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B0188	DOSIMETRIC MODEL APPENDIX "I"		FOULKE J

RIL SUBJECT/DESCRIPTION

DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO PHOTON AND ELECTRON RADIATIONS

RES COMMENTS

THIS RIL TRANSMITS A COMPILATION OF DOSE-RATE CONVERSION FACTORS FOR USE IN CALCULATING EXTERNAL EXPOSURE TO PHOTON AND ELECTRON RADIATION FOR 240 RADIONUCLIDES OF POTENTIAL IMPORTANCE IN ROUTINE RELEASES FROM NUCLEAR FUEL CYCLES FACILITIES (NUREG/CR-0494).

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-160 **DATE ISSUED**: 08/25/80 **RIL TITLE**: VISUAL AESTHETIC IMPACT OF ALTERNATIVE COOLING SYSTEMS.

RESEARCH REVIEW GROUP NO.: 5-21 0-00 **SPONSORING OFFICE(S)**: NRR (76-14)

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

VISUAL AESTHETIC IMPACT OF ALTERNATIVE CLOSED CYCLE COOLING SYSTEMS.

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH TO DEVELOP A METHOD FOR ASSESSING THE VISUAL AESTHETIC IMPACT OF ALTERNATIVE CLOSED CYCLE COOLING SYSTEMS OF NUCLEAR POWER PLANTS. (NUREG/CR-0989).

THE RESULTS INDICATED THAT ON AVERAGE, A NATURAL DRAFT COOLING TOWER WILL CAUSE A STATISTICALLY SIGNIFICANT NEGATIVE VISUAL AESTHETIC IMPACT ON A COMMUNITY, COMPARED WITH USING A MECHANICAL DRAFT COOLING TOWER. WILLINGNESS-TO-PAY FOR A MECHANICAL DRAFT TOWER AS OPPOSED TO A NATURAL DRAFT TOWER RANGED FROM 0 TO $10 PER MONTH FOR AN AVERAGE HOUSEHOLD, DEPENDING ON SITE-SPECIFIC CONDITIONS SUCH AS METEOROLOGY, TOPOGRAPHY, AND DEMOGRAPHIC CHARACTERISTICS. PREDICTIVE MODELS RESULTING FROM THIS ANALYSIS CAN BE APPLIED TO ANY EXISTING OR PROPOSED NUCLEAR STATION SITE, USING READILY AVAILABLE DATA SOURCES.
ORIGINATOR: C. PRICHARD, HSWM,R ES; FIN: B2266

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-101 DATE ISSUED: 09/01/80 RIL TITLE: PERIPHERAL SHEARING STRENGTH OF CONCRETE STRUCTURAL ELEMENTS

RESEARCH REVIEW GROUP NO.: 3-07 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B5688	SHEAR STRESS IN REINF CONCRETE		BROWZIN B

RIL SUBJECT/DESCRIPTION

PERIPHERAL SHEARING STRENGTH OF REINFORCED CONCRETE STRUCTURAL ELEMENTS WITH BIAXIAL REINFORCING SUBJECTED TO TENSION.

RES COMMENTS

THIS RESEARCH INFORMATION LETTER (RIL) DESCRIBES THE RESULTS OF AN EXPERIMENTAL STUDY ON THE STATIC PERIPHERAL (PUNCHING) SHEAR STRENGTH OF REINFORCED CONCRETE ELEMENTS SUBJECTED TO BIAXIAL TENSION APPLIED THROUGH THE REINFORCEMENT (REFS. 1 AND 2). THE PHYSICAL SITUATION SIMULATED IN THE EXPERIMENTS IS THAT OF A STATIC FORCE APPLIED NORMALLY TO THE WALL OF A REINFORCED CONCRETE CONTAINMENT UNDER INTERNAL PRESSURE OR OTHER NUCLEAR SAFETY-RELATED CONCRETE STRUCTURES SUBJECT TO BIAXIAL TENSION. THE BIAXIAL TENSION PRODUCES A SYSTEM OF ORTHOGONAL CRACKS. THE NORMALLY APPLIED LOAD NECESSITATES THE TRANSFER OF PUNCH-TYPE SHEAR STRESS ACROSS THESE SLIGHTLY OPEN CRACKS. SIX-INCH THICK, FLAT REINFORCED CONCRETE SLABS WERE USED IN THE EXPERIMENTS. THEY WERE NOT INTENDED TO BE REPLICA-TYPE MODELS OF A TYPICAL CONTAINMENT WALL, BUT RATHER TO BE REPRESENTATIVE OF THE BEHAVIOR OF A CONTAINMENT UNDER THE SPECIFIED LOAD CONDITIONS. THE INHERENT PUNCHING SHEAR STRENGTH OF REINFORCED CONCRETE IN COMBINATION WITH BIAXIAL TENSION WAS HIGHER THAN EXPECTED, AND IT WAS OBSERVED TO BE MODERATELY SENSITIVE TO THE LEVEL OF BIAXIAL TENSION. A CRITIQUE OF THE CURRENT DESIGN FORMULA (REF. 3, CC-3421.6) IS MADE IN LIGHT OF THE RESULTS OF THIS STUDY.
ORIGINATOR: B. BROWZIN

OFFICE: NMSS IMPACT STATEMENT

SCHED. RESP. DATE: 01/30/80 ACTUAL RESP. DATE: / / USER OFFICE REVIEWER:

*** NMSS: APPLICATION TO THE REGULATORY PROCESS ***

*** NMSS: IMPACT OF RESULTS *** (NO DATA AVAILABLE)

*** NMSS: COMMENTS AND REMARKS *** (NO DATA AVAILABLE)

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/22/81 ACTUAL RESP. DATE: 05/22/81 USER OFFICE REVIEWER: B. BROWN

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

HIGH ENERGY LINES AND EQUIPMENT LIKE SAFETY RELIEF VALVES ARE FREQUENTLY ANCHORED TO THE WALLS OF REINFORCED CONCRETE CONTAINMENT STRUCTURES. FOR THE EVALUATION OF CONTAINMENT INTEGRITY IN THIS CASE IT BECOMES NECESSARY TO CONSIDER THE PERIPHERAL SHEARING (PUNCHING) STRENGTH OF THE REINFORCED CONCRETE IN COMBINATION WITH INTERIAL PRESSURES (BIAXIAL TENSION). DESIGN METHODOLOGY AND LICENSING CRITERIA FOR THIS LOAD COMBINATION HAS EVOLVED FROM ANALYTICAL APPROXIMATIONS WITHOUT THE BENEFIT OF DIRECTLY SUPPORTING EXPERIMENTS. THE RIL DESCRIBES THE FIRST KNOWN PHYSICAL TESTS OF ACTUAL PUNCHING SHEAR OF BIAXIALLY TENSIONED CONCRETE TOGETHER WITH A RECOMMENDATION FOR REVISING THE CODE FORMULA NOW IN USE.

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH PROVIDES PRELIMINARY DATA WHICH WITH ADDITIONAL SUPPORT, COULD EVENTUALLY LEAD TO A SUBSTANTIVE CHANGE IN THE CURRENT PERIPHERAL SHEAR FORMULA IN THE ASME CODE SECTION III, DIVISION). THIS CHANGE WOULD RECOGNIZE THAT THE PRESENT DESIGN METHODOLOGY IS OVERCONSERVATIVE AND LEAD TO A RELAXATION OF OUR CURRENT REQUIREMENTS WITH REGARD TO PERIPHERAL SHEARING STRENGTH. IT IS PREMATURE TO IMPLEMENT THE RESEARCH RESULTS WITHOUT ADDITIONAL AND COMPREHENSIVE EXPERIMENTAL SUPPORT. THE EXPERIMENTS WERE PERFORMED ONLY ON A THIN CONCRETE ELEMENT (6 INCH THICK SLAB) WITH A FIXED REINFORCEMENT RATIO.

*** NRR : COMMENTS AND REMARKS ***

THE CURRENT RESEARCH RESULTS INDICATE THAT THE EXISTING ASME CODE REQUIREMENTS WITH RESPECT TO PERIPHERAL SHER ARE QUITE CONSERVATIVE.
2. PRIOR TO MAKING A RECOMMENDATION TO REDUCE THE CONSERVATISM OF THE PRESENT ASME CODE FORMULA, MORE DESIGN VARIABLES SUCH AS THE THICKNESS OF CONCRETE ELEMENTS, THE AMOUNT AND DISTRIBUTION OF REINFORCEMENT, THE APPLIED LOAD POSITIONS, AND THE SHEAR SPAN HAVE TO BE ACCOUNTED FOR IN FUTURE TESTS. IN THE MEANTIME, THE PRESENT ASME CODE FORMULA SHOULD CONTINUE TO SERVE AS THE BASIS FOR OUR LICENSING REVIEW PERTAINING TO THE ISSUE OF CONCRETE PERIPHERAL SHEAR STRENGTH UNDER BIAXIAL TENSION.
3. THE COMMENTS AND CONCLUSIONS PROVIDED ABOVE ARE, IN OUR OPINION, CONSISTENT WITH THOSE OF DR. C. P. SIESS OF THE ACRS.

RIL NO: 80-102 **DATE ISSUED**: 09/12/80 **RIL TITLE**: STRUCTURAL BUILDING RESPONSE

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR, SD (RR NRR 76-8

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A0130	SSMRP STRUCTURAL PROJECT (PREV B5614)		GUZY D

RIL SUBJECT/DESCRIPTION

REVIEW: PHASE I OF PROJECT IV OF THE SEISMIC MARGINS RESEARCH PROGRAM

RES COMMENTS

THIS RESEARCH INFORMATION LETTER (RIL) DESCRIBES THE RESULTS OF A STUDY TO REVIEW THE STATE-OF-THE-ART IN NUCLEAR POWER PLANT STRUCTURAL BUILDING RESPONSE COMPUTATION. THIS STUDY, INITIATED UNDER THE SEISMIC SAFETY MARGINS RESEARCH PROGRAM (SSMRP), IS NOT INTENDED TO ADVANCE THE ART; RATHER, IT WILL BE USED TO IDENTIFY ANALYTICAL METHODS FOR REALISTICALLY CHARACTERIZING THE SEISMIC RESPONSE OF NUCLEAR POWER PLANT STRUCTURES. THE FINDINGS OF THE SUBJECT STUDY, AS DISCUSSED IN THIS RIL, SHOULD PROVIDE THE STAFF WITH A BASIS FOR DETAILED REVIEW IN THE AREAS OF ANALYTICAL METHODS, STRUCTURAL MODELING, UNCERTAINTY, NONLINEAR BEHAVIOR, METHODS TO ACCOUNT FOR INTERACTIONS AND NONSEISMIC RESPONSE. BECAUSE THIS IS A RIL FOR THE SSMRP, BACKGROUND INFORMATION ON THE SSMRP IS PROVIDED IN ADDITION TO A DESCRIPTIVE SUMMARY OF THE STRUCTURAL BUILDING RESPONSE REVIEW STUDY.
DOCUMENTS ISSUED: NUREG/CR-1423, VOLS. 1 AND 2.
ORIGINATOR: C. BURGER, RSR, RES

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 10/21/81 USER OFFICE REVIEWER: G. KNIGHTON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RIL DESCRIBES SEISMIC DESIGN METHODS AND THE RANDOM VARIABLES AND THE MODELING UNCERTAINTIES INHERENT IN THESE METHODS FOR THE CASE OF SEISMIC DESIGN OF BUILDING STRUCTURES. IMPROVED KNOWLEDGE OF ERERORS AND UNCERTAINTIES IN SEISMIC DESIGN ANALYSIS IS DESIRABLE IN ORDER TO ESTIMATE SEISMIC SAFETY MARGINS IN NUCLEAR POWER PLANTS. FIVE MAJOR AREAS OF SEISMIC RESPONSE ANALYSIS WERE REVIEWED: STRUCTURAL MODELING, METHODS OF STRUCTURAL ANALYSIS, STRUCTURAL DAMPING VALUES, NON-LINEAR BEHAVIOR OF MATERIALS AN STRUCTURES, AND THE UNCERTAINTY IN SEISMIC ANALYSES.

*** NRR : IMPACT OF RESULTS ***

THE RIL AND ITS SUPPORTING DOCUMENTS PROVIDE A USEFUL QUALITATIVE IDENTIFICATION OF SOURCES OF UNCERTAINTIES AND RANDOM VARIABLES IN BUILDING STRUCTURES SEISMIC ANALYSIS. THIS PROVIDES A BASIS FOR FUTURE RESEARCH. BY ITSELF, THE REVIEW GIVES QUALITATIVE EVIDENCE FOR THE EXISTENCE OF SUBSTANTIAL SAFETY MARGINS IN SEISMIC ANALYSIS. THE RIL ALSO OFFERS RECOMMENDATIONS AND REMAKRS PERTAINING TO LICENSING REVIEWS IN AREAS OF (1) FLOOR MOTION, (2) LUMPED-MASS-BEAM APPROACH, (3) HYDRODYNAMIC EFFECTS, (4) DECOUPLING CRITERIA FOR LARGE SYSTEMS, AND (5) NON-LINEAR ANALYSIS. THE RIL COMMENTS FAVORABLY ON DAMPING VALUES GIVEN IN R.G. L.6L.

*** NRR : COMMENTS AND REMARKS ***

1. AS THIS RIL REPORTS ON TWO REVIEW TYPE DOCUMENTS, IT IS A CONVENIENT ORGANIZATION OF INFORMATION, BUT IT DOES NOT PRESENT ANY SUBSTANTIAL NEW INFORMATION OR INFORMATION FOR LICENSING NPURPOSES THAT THE NRR STAFF WAS NOT PREVIOUSLY AWARE OF.
2. BENCHMARKING PROGRAMS NOW BEING PLANNED ARE AIMED AT QUANTIFYING MANY OF THE UNCERTAINTIES IDENTIFIED BY THE RIL.
3. THERE IS NO MATERIAL IDENTIFIED BY THIS RIL THAT IS RECOMMENDED FOR ASLB NOTIFICATION.

RIL NO: 80-103 DATE ISSUED: 09/13/80 RIL TITLE: BEST ESTIMATE EVALUATION METHOD

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR (RR NRR 76-8)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A0130	SSMRP STRUCTURAL PROJECT (PREV B5614)		GUZY D

RIL SUBJECT/DESCRIPTION

APPLIED CALCULATION OF THREE-DIMENSIONAL SEISMIC RESPONSE.

RES COMMENTS

THIS RESEARCH INFORMATION LETTER (RIL) DESCRIBES HOW TWO TECHNIQUES, BEST ESTIMATE AND EVALUATION METHOD, CAN BE APPLIED TO THE TRADITIONAL SEISMIC ANALYSIS AND DESIGN OF A NUCLEAR POWER PLANT. THE SEISMIC ANALYSIS AND DESIGN METHODOLOGY CHAIN IS COMPRISED OF SEISMIC INPUT, SOIL-STRUCTURE INTERACTION, STRUCTURAL RESPONSE AND SUBSYSTEM RESPONSE. THE OBJECTIVE OF THIS STUDY IS TO CHARACTERIZE THE COMPOUNDING EFFECT OF CONSERVATIVE ASSUMPTIONS MADE AT VARIOUS LINKS OF THE SEISMIC DESIGN CHAIR. FUTURE WORK SHOULD PROVIDE FURTHER INSIGHT ON THE OVERALL CONSERVATISM IN SEISMIC ANALYSIS AND DESIGN METHODOLOGY AS WELL AS ON RELATIVE CONSERVATISMS BY SELECTIVELY COMBINING DESIRED DESIGN LINKS. AN ILLUSTRATIVE EXAMPLE IS USED IN THIS STUDY THAT LINKS THREE-DIRECTIONAL SEISMIC EXCITATION AND STRUCTURAL RESPONSE TO COMPARE THE RESULTS OF BOTH TECHNIQUES IN TERMS OF FACTORS OF COMPARISON AND PROBABILITIES OF EXCEEDANCE.
DOCUMENT ISSUED: NUREG/CR-1489
ORIGINATOR: C. BURGER, RSR, RES

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 09/13/81 ACTUAL RESP. DATE: 09/13/81 USER OFFICE REVIEWER: G. KNIGHTON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RIL DESCRIBES WORK PERFORMED AS A PORTION OF THE SEISMIC SAFETY MARGINS RESEARCH PROGRAM (SSMRP). THE OBJECTIVE WAS TO COMPARE FOR A SAMPLE STRUCTURAL PROBLEM (MAIN STEAM VALVE HOUSE AND QUENCH SPRAY AREA) TWO DIFFERENT METHODS OF ANALYSIS FOR RESPONSE TO SEISMIC INPUT. THE DIFFERENCE IN METHODOLOGIES FOR THE SO-CALLED "BEST-ESTIMATE" (BE) METHOD AND THE "EVALUATION METHOD" (EM) WAS DESCRIBED. THE BE METHOD USED A SOPHISTICATED TREATMENT OF GROUND MOTION IN THREE DIMENSIONS AND A PROBABILISTIC APPROACH IN DETERMINING STRUCTURAL RESPONSE. FOR THE EM METHOD, GROUND MOTION WAS TKEN AS THE SQUARE ROOT OF THE SUM OF THE SQUARES AND VARIABILITY IN STRUCUTRAL STIFFNESS AND DAMPING WAS MODELED BY PEAK BROADENING OF IN-STRUCUTRE RESP;ONSE SPECTRA WITH ASSIGNED VALUES OF FREQUENCY AND DAMPING.

*** NRR : IMPACT OF RESULTS ***

THE WORK ILLUSTRATED THAT LARGE DIFFERENCES (OFTEN LARGE BUT NOT CONSISTENTLY SO) IN STRUCTURAL RESPONSE COULD BE GENERATED BY THE TWO METHODS. THIS WAS QUANTIFIED BY INTRODUCTION A "FACTOR OF COMPARISON (FOC) AND PROBABILITIES OF EXCEEDANCE (POE) BOTH OF WHICH WERE PRESENTED AS A FUNCTION OF FREQUENCY. THE FOE RANGED BETWEEN 1.5 AND 8, SHOWING THESE FACTORS OF CONSERVATISM FOR THE EM METHODS AS COMPARED TO THE BE METHOD. THE POE, A MEASURE OF THE PROBABILITY OF EXCEEDING DESIGN LOADS SHOULD A LARGE EARTHTQUAKE OCCUR VARIED BETWEEN 10 TO THE MINUS 1 TO 10 TO MINUS 5. THE RESULTS OF THE STUDY HAVE NO IMMEDIATE IMPACT ON LICENSING ACTIONS, BUT RATHER ILLUSTRATE THE EXISTENCE OF CONSERVATISM IN PLANT SEISMIC DESIGN AND ALSO ILLUSTRATE THE METHODOLOGY DEVELOPING AS A RESULT OF THE SSMRP PROGRAM.

*** NRR : COMMENTS AND REMARKS ***

1. THIS RESEARCH HAS NOT RESULTED IN THE DEVELOPMENT OF INFORMATION THAT SHOULD BE CONSIDERED FOR BOARD NOTIFICATION.
2. THIS STUDY WAS THE FIRST ATTEMPT TO SYSTEMATICALLY COMPARE TWO SEISMIC DESIGN METHODS. SUBSTANTIAL FURTHER WORK IN THIS AREA IS NEEDED, INICLUDING BENCHMARKING AGAINST AVAILABLE DATA. THE NATURE OF THIS FUTURE WORK AND ITS IMPLEMENTATION SHOULD AWAIT DEVELOPMENT OF AN NRR POSITION ON THIS TOPIC.$END

RIL NO: 80-104 **DATE ISSUED**: 09/08/80 **RIL TITLE**: PHOSPHORUS 32 IN EDIBLE FISH TISSUE

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: IE (RR IE 77-1)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B7478	BIOACCUMULATION FACTOR-P32		HAYES/PETERSON

RIL SUBJECT/DESCRIPTION

THE BIOACCUMULATION FACTOR FOR PHOSPHORUS 32 IN EDIBLE FISH TISSUE.

RES COMMENTS

A LITERATURE SEARCH WAS CONDUCTED TO REVIEW THE CONCENTRATIONS OF PHOSPHORUS IN EDIBLE TISSUES OF FISH AND IN VARIOUS BODIES OF WATER. USING GEOMETRIC MEAN CONCENTRATIONS, A STABLE PHOSPHORUS BIOACCUMULATION FACTOR OF 70,000 WAS CALCULATED. USING THE RADIOACTIVE DECAY CONSTANT OF P-32 AND DATA DERIVED FOR THE BIOLOGICAL TURNOVER RATE OF PHOSPHORUS IN FISH, A P-32 BIOACCUMULATION FACTOR OF 3000 WAS DERIVED.
DOCUMENT ISSUED: NUREG/CR-1336
ORIGINATOR: J. FOULKE, HSWM, RES.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-105 **DATE ISSUED**: 09/19/80 **RIL TITLE**: GEOPHYSICAL CORRELATIONS AND MODELING

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR, SD

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A4058	SEISMICITY STUDY, MASS & NH		MURPHY A

RIL SUBJECT/DESCRIPTION

GEOPHYSICAL CORRELATIONS AND MODELING OF A SELECTED AREA ACROSS THE CLINTON-NEWBURY/BLOODY BLUFF FAULT ZONES IN NORTHEASTERN MASSACHUSETTS

RES COMMENTS

THIS MEMORANDUM TRANSMITS THE RESULTS OF A GRAVITY SURVEY OF THE CLINTON NEWBURY AND BLOODY BLUFF FAULT ZONES IN NORTHEASTERN MASSACHUSETTS. IT IS A STUDY CORRELATING GRAVITY ANOMALIES, GEOMAGNETIC CONTOURS, AND THE SURFACE BEDROCK.
DOCUMENT ISSUED: NUREG/CR-1186
ORIGINATOR: R. BRAZEE, SAFER, RES

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-106 DATE ISSUED: 11/28/80 RIL TITLE: RANCHO SECO BUILDING WAKE EFFECTS ON ATMOSPHERIC DISPERSION

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR, SD

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

RANCHO SECO BUILDING WAKE EFFECTS ON ATMOSPHERIC DISPERSION

RES COMMENTS

THIS MEMORANDUM TRANSMITS THE RESULTS OF COMPLETED RESEARCH ON CHARACTERIZING THE EFFECTS ON ATMOSPHERIC DISPERSION FROM BUILDING WAKES AROUND A LARGE REACTOR COMPLEX LOCATED IN FLAT TERRAIN. THE RESULTS TRANSMITTED HEREWITH IMPROVE AND EXPAND THE CURRENT DATA BASE USED TO DEVELOP APPROPRIATE STANDARDS AND REGULATORY GUIDES IN ATMOSPHERIC DISPERSION.
DOCUMENT ISSUED: NUREG/CR-0456
ORIGINATOR: R. ABBEY, HSWM, RES.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 01/12/81 ACTUAL RESP. DATE: 01/12/81 USER OFFICE REVIEWER: E. H. MARKEE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RESEARCH WAS PART OF A PROGRAM OF FIELD MEASUREMENTS (AT TWO REACTORS) AND WIND TUNNEL STUDIES TO TEST NRC'S LICENSING MODELS OF ATMOSPHERIC DISPERSION OF REACTOR EFFLUENTS.

*** NRR : IMPACT OF RESULTS ***

THE MEASURED VALVES FROM THE RANCHO SECO STUDY WERE AS MUCH AS TWO ORDERS OF MAGNITUDE BELOW PREDICTED VALVES USING APPROPRIATE NRC LICENSING MODELS. THE RESULTS OF THE RESEARCH WERE USED IN REGULATORY GUIDE 1.145 TO MODIFY LICENSING MODELS PREVIOUSLY USED TO ESTIMATE RELATIVE CONCENTRATIONS OF AIRBORNE EFFLUENTS. FINAL CONCLUSIONS CONCERNING EFFECTS ON OUR MODELS AWAIT A RIL ON REMAINING PORTIONS OF THE RESEARCH PROGRAM.

*** NRR : COMMENTS AND REMARKS ***

THE INFORMATION IN THIS RIL NEED NOT BE CONSIDERED FOR BOARD NOTIFICATION.

THE RESEARCH PROGRAM OF WHICH THE RANCHO SECO STUDY IS A PART HAS BEEN COMPLETED. NO ADDITIONAL WORK IS NEEDED.

BEST DOCUMENT AVAILABLE

182

RIL NO: 80-107 DATE ISSUED: 12/16/80 RIL TITLE: RELAP/MOD 7 COMPUTER PROGRAM

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A6047	CODE ASSESSMENT & APPL		ODAR F

RIL SUBJECT/DESCRIPTION

RELAP/MOD 7 COMPUTER PROGRAM

RES COMMENTS

A RESEARCH INFORMATION LETTER IS BEING ISSUED DESCRIBING THE RELAP4/MOD 7 CODE. THIS CODE HAS BEEN DESIGNED AS A BEST-ESTIMATE LARGE BREAK LOCA ANALYSIS TOOL. THE CODE MORE ACCURATELY CALCULATES THE BLOWDOWN AND REFILL STAGES THAN DOES THE PELAP4/MOD 6 CODE. THE CALCULATIONAL CAPABILITY OF THE REFLOOD STAGE IS ALMOST THE SAME AS IN THE RELAP4/MOD 6 CODE.
ORIGINATOR: F. ODAR, RSR, RES

***** NO OFFICE IMPACT STATEMENTS *****

BEST DOCUMENT AVAILABLE

RIL NO: 80-108 DATE ISSUED: 01/06/81 RIL TITLE: SUMMARY OF WRAP-PWR-EM RIL

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B4126	WRAP-EM DEVELOPMENT		LEE T

RIL SUBJECT/DESCRIPTION

WATER REACTOR ANALYSIS PACKAGE FOR AUDIT OF VENDOR

RES COMMENTS

THE ATTACHED RIL DESCRIBES THE WATER REACTOR ANALYSIS PACKAGE FOR AUDIT OF VENDOR LOCA EVALUATION MODEL CALCULATIONS FOR PRESSURIZED WATER REACTORS. THE PACKAGE CONSISTS OF SEVERAL COMPER CODES WHICH ARE INTERFACED AUTOMATICALLY. THE CODES AND INTERFACES ARE DESCRIBED AND EXAMPLES OF WRAP CHECK-OUT CALCULATIONS ARE GIVEN.
ORIGINATOR: L. SHOTKIN, RSR, RE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/01/81 ACTUAL RESP. DATE: 03/01/81 USER OFFICE REVIEWER: R. F. AUDETTE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

TO PERFORM INDEPENDENT AUDITS OF PWR VENDORS LARGE AND SMALL BREAK LOCA ANALYSIS METHODS AND APPLICATIONS SUBMITTED TO SATISFY REQUIREMENTS OF 10 CFR 50, APPENDIX K, AND 10 CFR 50.46.

*** NRR : IMPACT OF RESULTS ***

THE DEVELOPMENT PROGRAM DESCRIBED IN THE RIL HAS PROVIDED AUTOMATED INTERFACING AND USER - CONVENIENT INPUT METHODS FOR THE FOUR COMPUTER PROGRAMS CONSTITUTING THE PWR-WRAP-EM PACKAGE. ALSO INCLUDED IS A STEADY-STATE INITIALIZING PROCEDURE WHICH ALLOWS FOR RAPID, CONVENIENT CHANGES IN OPERATING CONDITIONS ASSUMED FOR THE INITIATION OF A LOCA. THE PURPOSE OF THIS EFFORT WAS TO PROVIDE RAPID ERROR FREE PROCESSING OF THE ENTIRE LOCA TRANSIENT AND TO THE EXTENT POSSIBLE, A SATISFACTORY REALIZATION OF THIS GOAL WAS ACHIEVED.

*** NRR : COMMENTS AND REMARKS ***

SOME PROBLEMS AND INADEQUACIES CONTINUE TO EXIST IN THE COMPONENT CODES USED IN WRAP WHICH NEED TO BE RESOLVED BEFORE THE CODE PACKAGE CAN BE USED EFFECTIVELY. SOME OF THESE ARE DESCRIBED IN THE RIL. WE ARE CURRENTLY REVIEWING OUR ANALYTICAL NEEDS TO DETERMINE HOW BEST TO EVALUATE AND AUDIT VENDOR ANALYTICAL METHODS AND CALCULATIONS. AS A RESULT, WE EXPECT TO MAKE RECOMMENDATIONS SOON REGARDING INFORMATION IN THE WRAP PROGRAM AND ANY FUTURE PLANS.

BEST DOCUMENT AVAILABLE

R1230320
REQUESTOR: FDC

RESEARCH PROJECT CONTROL SYSTEM
RESEARCH RESULTS UTILIZATION REPORT
** ISSUED RILS **

RIL NO: 80-109 DATE ISSUED: 01/06/81 RIL TITLE: SUMMARY OF WRAP-BWR-EM RIL

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B6126	WRAP-EM DEVELOPMENT		LEE T

RIL SUBJECT/DESCRIPTION

WATER REACTOR ANALYSIS PACKAGE FOR AUDIT

RES COMMENTS

THE ATTACHED RIL DESCRIBES THE WATER REACTOR ANALYSIS PACKAGE FOR AUDIT OF VENDOR LOCA EVALUATION MODEL CALCULATIONS FOR BOILING WATER REACTORS. THE PACKAGE CONSISTS OF SEVERAL COMPUTER CODES WHICH ARE INTERFACED AUTOMATICALLY. THE CODES AND INTERFACES ARE DESCRIBED AND EXAMPLES OF WRAP CHECK-OUT CALCULATIONS ARE GIVEN.
ORIGINATOR: L. SHOTKIN, RSR, RES

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/01/81 ACTUAL RESP. DATE: 03/01/81 USER OFFICE REVIEWER: R. F. AUDETTE

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

TO PERFORM INDEPENDENT AUDITS OF BWR VENDORS LARGE AND SMALL BREAK LOCA ANALYSIS METHODS AND APPLICATIONS SUBMITTED TO SATISFY REQUIREMENTS OF 10 CFR 50, APPENDIX K, AND 10 CFR 50.46.

*** NRR : IMPACT OF RESULTS ***

THE DEVELOPMENT PROGRAM DESCRIBED IN THE RIL HAS PROVIDED AUTOMATED INTERFACING AND USER-CONVENIENT INPUT METHODS FOR THE FOUR COMPUTER PROGRAMS CONSTITUTING THE BWR-WRAP-EM PACKAGE. ALSO INCLUDED IS A STEADY-STATE INITIALIZING PROCEDURE WHICH ALLOWS FOR RAPID CONVENIENT CHANGES IN OPERATING CONDITIONS ASSUMED FOR THE INITIATION OF A LOCA. THE PURPOSE OF THIS EFFORT WAS TO PROVIDE RAPID ERROR FREE PROCESSING OF THE ENTIRE LOCA TRANSIENT AND TO THE EXTENT POSSIBLE, A SATISFACTORY REALIZATION OF THIS GOAL WAS ACHIEVED.

*** NRR : COMMENTS AND REMARKS ***

SOME PROBLEMS AND INADEQUACIES CONTINUE TO EXIST IN THE COMPONENT CODES USED IN WRAP WHICH NEED TO BE RESOLVED BEFORE THE CODE PACKAGE CAN BE USED EFFECTIVELY. SOME OF THESE ARE DESCRIBED IN THE RIL. WE ARE CURRENTLY REVIEWING OUR ANALYTICAL NEEDS TO DETERMINE HOW BEST TO EVALUATE AND AUDIT VENDOR ANALYTICAL METHODS AND CALCULATIONS. AS A RESULT, WE EXPECT TO MAKE RECOMMENDATIONS SOON REGARDING INFORMATION IN THE WRAP PROGRAM AND ANY FUTURE PLANS.

RIL NO: 80-110 **DATE ISSUED**: 01/16/81 **RIL TITLE**: RELATIVE HAZARD OF RADIOIODINE AS A FUNCTION OF RADIATION

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

FUNCTION OF RADIATION - QUALITY AND AGE AT EXPOSURE

RES COMMENTS

TO IDENTIFY THE INFLUENCE OF THE PHYSICAL CHARACTERISTICS OF RADIOIODINE ISOTOPES AND THYROID GLAND MATURITY ON THE EFFECTIVENESS OF RADIOIODINE EXPOSURE, TWO STUDIES WERE PERFORMED. IN THE FIRST STUDY, RATS WERE EXPOSED TO I-132 OR I-131 AND THEIR THYROIDS STIMULATED WITH A GOITROGEN. EQUAL SUPPRESSION OF THYROID WEIGHT INCRESE WAS FOUND FOR 280 RADS OF I-132 AND 2500 RADS OF I-131, INDICATING NEARLY A FACTOR OF TEN GREATER EFFECTIVENESS FOR I-132. IN THE SECOND STUDY GUINEA PIGS OF DIFFERENT AGES WERE EXPOSED TO I-131 AND THYROID FUNCTION MEASURED 100 DAYS LATER. THE RESULTS SHOWED THAT FETUSES AND WEANLINGS WERE ABOUT ONE AND A HALF TIMES AS RADIOSENSITIVE AS ADULTS AND ABOUT TWICE AS SENSITIVE AS NEWBORNS.
ORIGINATOR: J. FOULKE, HSWM; DOCUMENT ISSUED: NUREG/CR-1228 (FIN B -3028).

BEST DOCUMENT AVAILABLE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 04/12/81 ACTUAL RESP. DATE: 04/12/81 USER OFFICE REVIEWER: W. KREGER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS STUDY WAS UNDERTAKEN TO VERIFY AND QUANTIFY STAFF ASSUMPTIONS, IN ACCIDENT CONSEQUENCE ASSESSMENTS, THAT SHORT-LIVED RADIOIODINES PRODUCE MORE BIOLOGICAL DAMAGE THAN THE SAME DOSE OF IODINE 131 AND THAT THE IMMATURE THYROID GLAND IS MORE RADIOSENSITIVE THAN THAT OF THE ADULT (FIN #B3028).

*** NRR : IMPACT OF RESULTS ***

1. THE STUDY OF THE INFLUENCE OF RADIATION QUALITY CONFIRMED THE APPROPRIATENESS OF THE FACTOR OF 10 USED FOR THE INCREASED EFFECTIVENESS OF SHORT-LIVED RADIOIODIUES.
2. THE STUDY OF THE INFLUENCE OF AGE AT EXPOSURE CONFIRMED THE GREATER THYROIDAL RADIOSENSITIVITY OF FETUSES AND WEANLINGS COMPARED TO ADULTS. IN ADDITION, IT QUANTIFIED THE RISK FACTOR DIFFERENCE AS LESS THAN AN ORDER OF MAGNITUDE.
3. ALTHOUGH THE RESULTS OF THIS STUDY SHOW NO NONCONSERVATISIM IN STAFF ASSUMPTIONS, WE WILL CONSIDER THESE RESULTS FOR POSSIBLE CHANGES IN RADIATION GUIDELINES.

*** NRR : COMMENTS AND REMARKS ***

THIS RESEARCH PROJECT HAS BEEN COMPLETED. CONSIDERATION FOR HEARING BOARD NOTIFICATION IS NOT CONSIDERED NECESSARY.

RIL NO: 80-111 **DATE ISSUED**: 01/26/81 **RIL TITLE**: ACUTE EFFECTS OF INHALATION EXPOSURE TO "URANIUM"

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: SD (RR SD 77-4)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A4083	STUDY OF UF6/UO2F2 IN EXPERIMENTAL ANIMALS		FOULKE J

RIL SUBJECT/DESCRIPTION

HEXAFLUORIDE AND PATTERNS OF DISPOSITION.

RES COMMENTS

A NUMBER OF EXPERIMENTS WERE PERFORMED TO DETERMINE THE DEPOSITION, RETENTION, AND EXCRETION OF URANIUM, AS WELL AS THE ACUTE TOXICITY, RESULTING FROM EXPOSURE TO URANIUM HEXAFLUORIDE AND ITS HYDROLYSIS PRODUCTS. BOTH RATS AND DOGS WERE EXPOSED BY INHALATION, INTRATRACHEAL INSTILLATION, OR INTRAVENOUS INJECTION. RESULTS TO DATE SUPPORT THE RELATION BETWEEN ABSORBED DOSE AND URINARY ELIMINATION RATE PROPOSED BY THE ICRP FOR U(+6) COMPOUNDS. THE PULMONARY RETENTION TIME FOR UO2F2 IS EXTREMELY SHORT (HALF-TIME); RETENTION FUNCTIONS FOR KIDNEY AND BONE ARE NOT YET AVAILABLE. THE THRESHOLD ABSORBED DOSE FOR PRODUCING RENAL INJURY IS OF THE ORDER OF 10 MICRO-G PER KG BODY WEIGHT. IN DOGS AND RATS GLUCOSURIA APPEARS TO BE A MORE SENSITIVE INDICATOR OF RENAL INJURY THAN ALBUMINURIA OR PLASMA UREA NITROGEN LEVELS.
ORIGINATOR: J. FOULKE, HSWM; DOCUMENT ISSUED: NUREG/CR-1045.

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-112 DATE ISSUED: 01/29/81 RIL TITLE: THORIUM WORKERS

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): SD (RR RES-77-3)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A2650	INHALED THORIUM EFFECTS		FOULKE J

RIL SUBJECT/DESCRIPTION

HEALTH STATUS AND BODY RADIOACTIVITY OF FORMER THORIUM WORKERS.

RES COMMENTS

THE HEALTH EFFECTS OF INDUSTRIAL EXPOSURE TO THORIUM ARE BEING INVESTIGATED BY STUDYING THE FORMER EMPLOYEES OF A THORIUM-PROCESSING PLANT. IN A STUDY COHORT OF 3039 MEN, THERE WERE 511 KNOWN DEATHS VERSUS 486.8 DEATHS EXPECTED ON THE BASIS OF AGE- AND YEAR-SPECIFIC MORTALITY RATES FOR U.S. WHITE MALES. IN GENERAL, DIFFERENCES BETWEEN THE OBSERVED AND EXPECTED NUMBERS OF DEATHS FROM SPECIFIC CAUSES SHOWED LITTLE ASSOCIATION WITH MEASURES OF THORIUM EXPOSURE (JOB TYPE AND LENGTH OF EMPLOYMENT). HOWEVER, THERE WAS A STATISTICALLY SIGNIFICANT EXCESS OF DEATHS FROM PANCREATIC CANCER AMONG MEN EMPLOYED A YEAR OR MORE (6 OBSERVED VS 1.3 EXPECTED) BUT NOT FOR SHORTER-TERM WORKERS (3 OBSERVED VS 2.7 EXPECTED). DATA ON A SMALL SAMPLE OF THE COHORT INDICATED A HIGHER PROPORTION OF CIGARETTE SMOKERS RELATIVE TO U.S. MALES, AND THIS COULD EXPLAIN AT LEAST PART OF THE EXCESS MORTALITY FROM LUNG CANCER AND RESPIRATORY DISEASES. A PUZZLING EXCESS OF DEATHS FROM MOTOR VEHICLE ACCIDENTS WAS FOUND (38 OBSERVED VS 23.2 EXPECTED). MEDICAL EXAMINATIONS AND MEASUREMENTS OF RESIDUAL BODY RADIOACTIVITY ARE BEING MADE ON A SUBPOPULATION OF 592 MEN MOST EXPOSED TO THORIUM. BY THORON-BREATH MEASUREMENTS, THORIUM DEPOSITION WAS DETECTED IN 131 OF 194 MEN WHO HAVE BEEN EXAMINED, AND MEASURABLE AMOUNTS OF BISMUTH-212 (RANGE 0.2 TO 3 NCI) WERE FOUND IN 55 OF THE MEN BY GAMMA-RAY MEASUREMENTS IN VIVO.
ORIGINATOR: J. FOULKE, HSWM; DOCUMENT ISSUED: NUREG/CR-1420

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 80-113 DATE ISSUED: 01/29/81 RIL TITLE: PRIMARY PIPING SYSTEMS

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): I&E, NRR, SD

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B2289	INTEGRATION OF NDE RELIABILITY AND FRACTURE MECHANICS		MUSCARA J

RIL SUBJECT/DESCRIPTION

RELIABILITY OF INSERVICE INSPECTION FOR PRIMARY PIPING SYSTEMS

RES COMMENTS

THIS RESEARCH INFORMATION LETTER TRANSMITS RESULTS OF RESEARCH ON THE INFLUENCE OF INSPECTION VARIABLES ON THE RELIABILITY AND EFFECTIVENESS OF ULTRASONIC TEST ISI FOR PRIMARY PIPING SYSTEM WELDMENTS. TO ESTABLISH THESE RESULTS, THOUSANDS OF MEASUREMENTS WERE MADE ON ARTIFICIALLY EMPLACED NOTCHES AND FATIGUE FLAWS INTO FLAT PLATE AND PIPING SAMPLES. A SERIES OF SHORTCOMINGS IN THE ASME CODE, SECTION XI, 1977 REVISION THROUGH SUMMER OF 1978 ARE DETAILED, INCLUDING CALIBRATION SENSITIVITY, INSPECTION ANGLE, SIZING, SURFACE CONDITION AND CONTOUR, SCAN OVERLAP, COVERAGE OF INSPECTION VOLUME, TRANSDUCER AND INSTRUMENT PERFORMANCE, AND AUSTENITIC AND DISSIMILAR WELD INSPECTION. SPECIFIC RECOMMENDATIONS ARE THE FOLLOWING: (1) UNTIL BETTER CALIBRATION REFLECTORS CAN BE DEVELOPED, THE REPORTING AND RECORDING DAC LEVEL (AS DEFINED BY SECTION XI, IWA-2232 AND APPENDIX III) BE LOWERED TO 50 AND 20 PERCENT, RESPECTIVELY, OF THE PRIMARY REFERENCE LEVEL FOR INSPECTIONS OF PIPE HAVING WALL THICKNESS EQUAL TO OR GREATER THAN 0.312 INCHES; (2) SHEAR WAVE INSPECTION AT 60 DEG. F. SHOULD BE REQUIRED IN ADDITION TO 45 DEG. INSPECTION, WITH REPORTING AND RECORDING LEVELS OF 100 AND 50 PERCENT, RESPECTIVELY, BEING ADDITIONALLY REQUIRED FOR THE 60 DEG. INSPECTION; (3) IN CASES WHERE FLAWS ARE TO BE ACCEPTED BY ANALYSIS, THE SIZING TECHNIQUES AND THEIR ACCURACY BE QUALIFIED UNDER CONDITIONS SIMILAR TO THAT OF THE FIELD APPLICATION; AND (4) SCAN OVERLAP SHALL BE SUFFICIENT TO PROVIDE SIGNALS FROM MINIMUM SIZED (LENGTH AND DEPTH) REPORTABLE DEFECTS SPECIFIED IN IWB 3500, WITH RESPONSE FROM EACH RECORDABLE DEFECT OPTIMIZED TO ESTABLISH ITS RESPONSE RELATIVE TO THE REPORTING LEVEL.
DOCUMENT ISSUED: NUREG/CR-1696
ORIGINATOR: J. MUSCARA, RSR, RES

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/29/81 ACTUAL RESP. DATE: 05/29/81 USER OFFICE REVIEWER: W. HAZELTON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SECTION 5.2.4 OF THE SRP STATES: "THE CONDUCT OF PERIODIC INSPECTIONS AND LEAKAGE AND HYDROSTATIC TESTING OF PRESSURE-RETAINING COMPONENTS OF THE REACTOR COOLANT PRESSURE BOUNDARY IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION XI OF THE ASME CODE PROVIDES REASONABLE ASSURANCE THAT EVIDENCE OF STRUCTURAL DEGRADATION OR LOSS OF LEAK TIGHT INTEGRITY OCCURRING DURING SERVICE WILL BE DETECTED IN TIME TO PERMIT CORRECTIVE ACTION BEFORE THE SAFETY FUNCTION OF A COMPONENT IS COMPROMISED." THIS PROGRAM IS INTENDED TO ESTABLISH THE RELIABILITY OF INSERVICE INSPECTION OF REACTOR PRIMARY PIPING AND ITS IMPACT ON SYSTEM INTEGRITY. THE RESEARCH WILL CONFIRM THAT THE SRP SECTION 5.2.4 STATEMENT IS CORRECT WITH RESPECT TO INSPECTIONS OR WILL PROVIDE INFORMATION TO SUPPORT A MODIFIED STATEMENT.

*** NRR : IMPACT OF RESULTS ***

THE PROGRAM HAS IDENTIFIED PROBLEM AREAS WHICH LIMIT THE EFFECTIVENESS OF PRESERVICE AND INSERVICE INSPECTION OF PRIMARY SYSTEM PIPING. THE PROGRAM INDICATES THAT CURRENT REQUIREMENTS IN SECTION XI OF THE ASME BOILDER AND PRESSURE VESSEL CODE FOR ULTRA SONIC INSPECTION PROVIDE LIMITED ASSURANCE THAT FLAWS LARGER THAN THE ACCEPTANCE STANDARDS WILL BE DETECTED. THE RIL INCLUDES FOUR RECOMMENDATIONS WHICH COULD INCREASE THE EFFECTIVENESS OF PRIMARY SYSTEM PIPINIG INSERVICE INSPECTIONS. THESE RECOMMENDATIONS INVOLVE CALIBRATION SENSITIVITY, INSPECTION ANGLE, SIZING AND SCAN OVERLAP. THESE CONCEPTS ARE BEING INCORPORATED IN A REGULATORY GUIDE NOW UNDER REVIEW. NRR WILL IMPLEMENT THE GUIDE WHEN IT IS ISSUED.

*** NRR : COMMENTS AND REMARKS ***

THE RIL DISCUSSES ONGOING RESEARCH TO VALIDATE AND IMPROVE THE EFFECTIVENESS OF INSERVICE INSPECTION. NRR CONTINUES TO ENDORSE THIS RESEARCH. SINCE NRR HAS BEEN AWARE OF THE PROBLEM AREAS IN INSERVICE INSPECTION PROCEDURES AND HAS CONSIDERED THESE POTENTIAL DEFICIENCIES IN ITS EVALUATION OF THE ACCEPTABILITY OF REQUIREMENTS TO ASSURE PIPING INTEGRITY, CONSIDERATION FOR BOARD NOTIFICATION IS NOT RECOMMENDED.

OFFICE: SD IMPACT STATEMENT

SCHED. RESP. DATE: 02/27/81 ACTUAL RESP. DATE: 02/27/81 USER OFFICE REVIEWER: R. G. SMITH

*** SD : APPLICATION TO THE REGULATORY PROCESS ***

RIL #113 HAS SOME VERY GOOD INFORMATION ABOUT THE RESPONSE DIFFERENCES BETWEEN HOLES AND NOTCHES WHICH WAS NOT PREVIOUSLY AVAILABLE IN THIS AREA. THIS NEW INFORMATION WILL BE PRESENTED TO SECTION XI FOR THEIR CONSIDERATION. MEANWHILE, I REQUEST THAT YOU HAVE YOUR CONTRACTOR INVESTIGATE OR EVALUATE FROM EXISTING DATA THE NUMBER OF FALSE CALLS THAT MAY BE GENERATED AS A FUNCTION OF THE RECORDING AND REPORTING LEVELS DURING ULTRASONIC INSPECTION OF PIPE WELDS.

*** SD : IMPACT OF RESULTS

THE RIL WILL BE HELPFUL TO OUR STAFF IN PROPOSING CODE CHANGES AND IN THE WRITING OF REGULATORY GUIDES.

*** SD : COMMENTS AND REMARKS ***

THIS ADDITIONAL INFORMATION WOULD BE VITAL TO ASSURE PRACTICALITY OF LOWERING THE RECORDING AND REPORTING LEVELS OF INDICATIONS AND WOULD BE NEEDED TO JUSTIFY REGULATORY GUIDE POSITIONS AND CONVINCE THE CODE WRITING GROUP TO MAKE THE NECESSARY CHANGES. IT MAY ALSO BE WORTHWHILE TO SHOW THE RESULTS OF 45 DEGREES AND 60 DEGREES ANGLE EXAMINATIONS SEPARATELY.

RIL NO: 81-114 DATE ISSUED: 02/18/81 RIL TITLE: PIPING BENCHMARK PROBLEMS

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A3225	MECH PIPING BENCHMARK		O'BRIEN J

RIL SUBJECT/DESCRIPTION

PIPING BENCHMARK PROBLEMS

RES COMMENTS

A SET OF BENCHMARK PROBLEMS AND SOLUTIONS HAS BEEN DEVELOPED FOR VERIFYING THE ADEQUACY OF COMPUTER PROGRAMS USED FOR DYNAMIC ANALYSIS AND DESIGN OF NUCLEAR PIPING SYSTEMS BY THE RESPONSE SPECTRUM METHOD. THE BENCHMARK PROBLEMS COVER A WIDE RANGE OF CONFIGURATIONS AND ARE ASSUMED TO EXPERIENCE LINEAR ELASTIC BEHAVIOR. THE DYNAMIC LOADING IS REPRESENTED BY UNIFORM SUPPORT MOTION ASSUMED TO BE INDUCED BY SEISMIC EXCITATION IN THREE SPATIAL DIRECTIONS. THE SOLUTIONS PROVIDE FREQUENCIES, PARTICIPATION FACTORS, NODAL DISPLACEMENT COMPONENTS AND INTERNAL FORCE AND MOMENT COMPONENTS.
ORIGINATOR: D. REIFF; DOCUMENTN ISSUED: NUREG/CR-1677.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/16/81 ACTUAL RESP. DATE: 03/16/81 USER OFFICE REVIEWER: M. HARTZMAN

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

SECTION 3.9.1 OF THE SRP REQUIRES APPLICANTS TO PROVIDE CONFIRMATION OF THE ADEQUACY OF THEIR COMPUTER PROGRAMS USED FOR ANALYSIS AND DESIGN OF CATEGORY I, ASME SECTION III PIPING SYSTEMS. A MEANS OF INDEPENDENT VERIFICATION BY THE MEB, DE, OF THIS ADEQUACY IS TO REQUIRE THAT THE APPLICANT SOLVE A SET OF BENCHMARK PROBLEMS WITH KNOWN SOLUTIONS. BY COMPARING THE APPLICANTS AND THE BENCHMARK SOLUTIONS THE ADEQUACY OF HIS COMPUTER PROGRAMS TO GENERATE RELIABLE DESIGN RESULTS CAN BE INDEPENDENTLY ASCERTAINED AND VERIFIED BY THE MEB. THESE BENCHMARK PROBLEMS ARE BEING REFERENCED EXPLICITLY IN THE UPCOMING REVISION OF SRP 3.9.1.

*** NRR : IMPACT OF RESULTS ***

THE BENCHMARK PROBLEMS AND SOLUTIONS GENERATED UNDER THIS PROGRAM WERE APPLIED TO VERIFY THE ADEQUACY OF PIPING COMPUTER PROGRAMS USED FOR REANALYSIS OF PIPING SYSTEMS IN FIVE PLANTS WHICH WERE SHUT DOWN IN 1979 AS A RESULT OF AN ERROR IN A COMPUTER PROGRAM USED IN THE INITIAL DESIGN OF THESE PLANTS. THESE PROBLEMS HAVE SINCE ALSO BEEN APPLIED TO VERIFY A NUMBER OF OTHER INDUSTRY COMPUTER PROGRAMS. OTHER PROBLEMS HAVE BEEN USED FOR INDEPENDENT VERIFICATION OF ANALYSIS TECHNIQUES PROPOSED BY APPLICANTS. THE RESEARCH IS ALSO PRODUCING COMPUTER PROGRAMS WHICH ARE BEING USED TO DEVELOP BENCHMARK PROBLEMS FOR INDUSTRY PROPOSED STATE-OF-THE-ART METHODS OF PIPING ANALYSIS AND WILL PROVIDE A CAPABILITY FOR MEB TO PERFORM INHOUSE CONFIRMATORY TYPE CALCULATIONS.

*** NRR : COMMENTS AND REMARKS ***

THIS PROJECT IS SCHEDULED FOR CONTINUATION FOR ANOTHER TWO YEARS. WORK TO BE ACCOMPLISHED INCLUDES DEVELOPING INELASTIC PIPING BENCHMARK PROBLEMS, AND PHYSICAL TESTS TO CONFIRM NUMERICAL SOLUTIONS. THE RESEARCH RESULTS CONTAIN NO INFORMATION WHICH SHOULD BE CONSIDERED FOR BOARD NOTIFICATION.

RIL NO: 81-115 **DATE ISSUED**: 02/25/81 **RIL TITLE**: INDEPENDENT ASSESSMENT OF TRAC-P1A COMPUTER CODE

RESEARCH REVIEW GROUP NO.: 0-00 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A7053	TRAC INDEPENDENT ASSESS		ODAR F

RIL SUBJECT/DESCRIPTION

INDEPENDENT ASSESSMENT OF TRAC-P1A COMPUTER CODE

RES COMMENTS

THIS RESEARCH INFORMATION LETTER PRESENT RESULTS OF INDEPENDENT ASSESSMENT OF THE TRAC-P1A CODE DESIGNED FOR DETAILED, BEST ESTIMATE ANALYSIS OF LARGE BREAK LOCA CONSEQUENCES IN PWR'S. THREE NATIONAL LABORATORIES, BNL, INEL, AND LASL, PARTICIPATED IN THIS WORK.

WHILE THIS CODE PROVIDES A SIGNIFICANTLY BETTER MODELING CAPABILITY AS COMPARED TO OTHER CODES SUCH AS RELAP-4/MOD 7, MANY WEAKNESSES WERE IDENTIFIED IN THE COURSE OF THIS WORK. THESE FINDINGS WERE OF GREAT VALUE TO THE DEVELOPERS OF THE TRAC-PD2 CODE VERSION WHICH WAS RELEASED TO THE PUBLIC IN OCTOBER 1980 AND WHICH SUPERSEDES TRAC-P1A.

TRAC-P1A CODE WAS FOUND SUITABLE FOR ANALYSIS OF LARGE BREAK LOCA AND UNSUITABLE FOR ANALYSES OF THE SMALL BREAK LOCA AND OPERATIONAL TRANSIENTS OF LONG DURATION.
ORIGINATOR: S. FABIC

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 03/24/81 ACTUAL RESP. DATE: 03/24/81 USER OFFICE REVIEWER: W. JENSEN/J. WATT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

DEVELOPMENT OF BEST ESTIMATE (BE) CODES FOR NRR WAS INITIATED UNDER USERS REQUEST 77-5. TRAC-P1A DEVELOPMENT AND A DESCRIPTION OF ITS INTENDED USE ARE REPORTED IN RIL #92. THE ASSESSMENT OF TRAC-P1A BROOKHAVEN NATIONAL LABORATORY (BNL) AND BY LOS ALAMOS SCIENTIFIC LABORATORY (LASL) IS PRESENTED IN RIL #115. THE LETTER PROVIDES A BASIS FOR NRR CONSIDERATION OF APPLICATION TO THE LICENSING PROCESS.

*** NRR : IMPACT OF RESULTS ***

CODE HAS NOT BEEN APPLIED BY NRR. TRAC-P1A CODES WAS SUPERSEDED BY THE TRAC-PD2 CODE VERSION WHEN THE LATTER WAS RELEASED TO THE PUBLIC IN OCTOBER 1980. ALTHOUGH THIS INFORMATION LETTER DESCRIBES STRENGHTS AND WEAKNESSES OF THE FIRST VERSION OF TRAC CODE, THE INFORMATION HERE CONTAINED WILL BE VERY VALUABLE INDETERMINING WHETHER SUBSTANTIAL IMPROVEMENTS WERE MADE IN THE SUBSEQUENT CODE VERSIONS.

*** NRR : COMMENTS AND REMARKS ***

THE ASSESSMENT DESCRIBES TRAC-P1A AS ADEQUATE FOR LARGE BREAK LOCA, PRIMARILY DUE TO ITS CAPABILITY TO HANDLE STRONG MULTIDIMENSIONAL AFFECTS. THE CODE IS NOT RECOMMENDED FOR ANALYSIS OF SMALL BREAKS OR OTHER TRANSIENTS OF LONG DURATION. THE INAVILITY OF THE TRAC-P1A CODE TO CONSERVE MASS AND TO ADEQUATELY PREDICT CORE REFLOOD WILL LIMIT IT'S USEFULLNESS. TRAC-P1A HAS NOT BEEN DEMONSTRATED TO BE MORE USEFUL TO NRR THAN RELAP-4, THE CURRENTLY AVAILABLE BLOWDOWN COMPUTER CODE. A NEW VERSION, TRAC-PD2 IS INTENDED TO REMOVE AS MANY IDENTIFIED WEAKNESSES AS POSSIBLE.

RIL NO: 81-116 DATE ISSUED: 03/02/81 RIL TITLE: MATHMETICAL PHANTOMS REPRESENTING CHILDREN OF VARIOUS AGES

RESEARCH REVIEW GROUP NO.: 0-00 0-00 0-00 SPONSORING OFFICE(S): NMSS,NRR,SD (RR-NRR-

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B0410	METHODS IN DOSIMETRY		FOULKE J

RIL SUBJECT/DESCRIPTION

MATHMETICAL PHANTOMS REPRESENTING CHILDREN OF VARIOUS AGES FOR USE IN ESTIMATES OF INTERNAL DOSE

RES COMMENTS

A SERIES OF MATHMETICAL PHANTOMS HAS BEEN DEVELOPED TO REPRESENT CHILDREN OF AGES 0, 1, 5, 10, AND 15 YEARS OF AGE. THE DATA ON ORGAN SIZE, SHAPE, AND LOCATION ARE USED IN CALCULATING ORGAN DOSES FROM INTERNAL AND EXTERNAL RADIATION EMITTERS. ORIGINATOR: J. FOULKE; DOCUMENT ISSUED: NUREG/CR-1159.

***** NO OFFICE IMPACT STATEMENTS *****

BEST DOCUMENT AVAILABLE

RIL NO: 81-117 DATE ISSUED: 04/10/81 RIL TITLE: PROBABILITY OF LARGE LOCA INDUCED BY EARTHQUAKES

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A0133	LOAD COMBINATIONS		O'BRIEN J

RIL SUBJECT/DESCRIPTION

PROBABILITY OF LARGE LOCA INDUCED BY EARTHQUAKES

RES COMMENTS

THIS RIL DESCRIBES WORK PERFORMED FOR THE U.S. NUCLEAR REGULATORY COMMISSION BY THE LOAD COMBINATIONS PROGRAM AT LAWRENCE LIVERMORE NATIONAL LABORATORY SINCE MARCH 1979. THE RESULTS INDICATE THAT THE PROBABILITY OF A DOUBLE-ENDED GUILLOTINE BREAK OF THE PRIMARY SYSTEM PIPING DURING AN EARTHQUAKE IS EXTREMELY SMALL. QUANTITATIVE SUPPORT IN A PROBABILISTIC FORMAT FOR THE LEAK-BEFORE-BREAK HYPOTHESIS IS ONE MAJOR FINDING.

(J. O'BRIEN, DET; REF: NUREG/CR-1889, JAN. 1981 (FIN A 1033)

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 05/18/81 USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE RESEARCH WAS UNDERTAKEN TO INITIATE A PROBABILISTIC ASSESSMENT OF THE SIMULTANEOUS OCCURRENCE OF A LARGE LOCA AND A SSE, WITH THE DIRECT OBJECTIVE OF ESTIMATING THE PROBABILITY OF THE COMBINED HAZARD OF ASYMMETRIC BLOWDOWN AND SEISMIC LOADS IN PWR'S. THIS INFORMATION WOULD BE APPLICABLE TO MANY OPERATING PWRS, SINCE UNTIL ABOUT 5 YEARS AGO THE ASYMMETRIC BLOWDOWN LOAD WAS NOT CONSIDERED IN CONJUNCTION WITH THE SEISMIC DESIGN. THIS PROGRAM ALSO CONTRIBUTES TO IMPROVING STRUCTURAL DESIGN METHODOLOGY BEYOND THE CURRENT (DETERMINISTIC) PRACTICE. THE OBJECTIVES OF PROBABILISTIC DESIGN ARE TO PROVIDE CONSISTENCY IN RELIABILITY LEVELS OF STRUCTURES IMPORTANT TO SAFETY, DEMONSTRATE THE DEGREE OF CONSERVATISM ACHIEVED, REDUCE CONGESTION OF SUPPORTS (PARTICULARLY PIPING) AND TO OTHERWISE REDUCE UNDESIRABLE AND POTENTIALLY HAZARDOUS FEATURES AND ATTRIBUTES OF OVERLY CONSERVATIVE DESIGNS.

*** NRR : IMPACT OF RESULTS ***

THIS PHASE OF THE RESEARCH CONSIDERED ONLY FATIGUE CRACKS GROWTH AS A MEANS TO INITIATE A DOUBLE-ENDED GUILLOTINE BREAK INDUCED BY AN EARTHQUAKE. THE RESULT, THEREFORE, IS THAT THE PROBABILITY OF FAILURE BY THIS MECHANISM, 1X10-13 PER 40-YEAR PLANT LIFE HAS NO DIRECT APPLICABILITY TO THE LICENSING PROCESS. IT IS NECESSARY TO ALSO RECOGNIZE THAT FATIGUE FAILURE MUST BE CONSIDERED IN CONJUNCTION WITH OTHER FAILURE MECHANISMS AND THEIR PROBABILITIES, NAMELY; STRESS CORROSION, WATER HAMMER, FATIGUE OF BIMETALLIC JOINTS, ERRORS OF DESIGN, CONSTRUCTION, ASSEMBLY AND INSPECTION, HIGHER FREE FIELD ACCELERATIONS, AND INDIRECT SEISMICALLY INDUCED LOCA PROBABILITIES. THESE RESULTS DETERMINED THAT LARGE PIPE FAILURE BY FATIGUE CRACK FAILURE ALONE DURING SSE IS HIGHLY UNLIKELY AND CONTRIBUTED TO THE GENERAL KNOWLEDGE OF THE STAFF THROUGH 1) DEMONSTRATING THE VIABILITY OF PROBABILISTIC STRUCTURAL DESIGN METHODS, AND 2) ILLUSTRATING THROUGH PROBABILISTIC FRACTURE MECHANICS THAT A LEAK THROUGH PIPE CRACK IS ABOUT 10-6 TIMES MROE PROBABLE THAN THIS CRACK LEADING TO GUILLOTINE FAILURE BY FATIGUE.

*** NRR : COMMENTS AND REMARKS ***

1. WE BELIEVE THE PROGRAM SHOULD BE CONTINUED AND CONSIDER THE MORE SIGNIFICANT FAILURE MECHANISMS IDENTIFIED ABOUT AND THE ADDITIONAL COMMENTS GIVEN BELOW.
2. STUDIES SO FAR COVER ONLY LARGE SIZE AUSTENITIC STEEL PIPING AND DO NOT YET EXTEND TO THE FERRITIC STEEL PIPING WITH VARIOUS SIZE, LOADING, TEMPERATURE AND ENVIRONMENTAL CONDITIONS. BWRS AND PWRS REMAIN TO BE INVESTIGATED. GENERAL CONCLUSIONS CANNOT BE DRAWN SINCE ONLY ZION UNIT 1 WAS USED IN THE INVESTIGATION.
3. THE PROBABILITY FO A LONGITUDINALLY ORIENTED SLOT BREAK WAS NOT INVESTIGATED. THIS MAY BE MORE LIKELY TO OCCUR IN SHORT AND LARGE PIPES AND ITS CONSEQUENCES CAN BE AS SEVERE AS A GUILLOTINE BREAK.

RIL NO: 81-118 DATE ISSUED: 04/14/81 RIL TITLE: VARIATION OF THE RESONANCE COMPONENT

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

VARIATION OF THE RESONANCE COMPONENT OF THE DOPPLER COEFFICIENT WITH DEPLETION

RES COMMENTS

THIS RIL REPORTS THE RESULTS OF AN ANALYTICAL INVESTIGATION OF THE EFFECT OF FISSION PRODUCTS ON THE RESONANCE COMPONENT OF THE LOCAL DOPPLER COEFFICIENT. THE DOPPLER EFFECT, OR BROADENING OF NUCLEAR RESONANT CROSS SECTIONS WITH TEMPERATURE INCREASE, IS ONE OF THE MAJOR REACTIVITY FEEDBACK MECHANISMS WHICH TERMINATES SHORT-TERM POWER INCREASES IN NUCLEAR REACTORS. THIS STUDY IS IMPORTANT IN THAT IT ADDS TO OUR UNDERSTANDING OF THE CALCULATION OF THE DOPPLER COEFFICIENT AND CAN AID NRR IN REVIEWING VENDOR CALCULATIONS OF ACCIDENTS IN WHICH DOPPLER FEEDBACK IS IMPORTANT.

(L. SHOTKIN, AMB, DAE)

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/11/81 ACTUAL RESP. DATE: 05/11/81 USER OFFICE REVIEWER: H. RICHINGS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE DOPPLER EFFECT IS A COMPONENT IN MOST REACTOR TRANSIENT ANALYSES. THE PROGRAM WORKED ON IN THIS RESEARCH PROGRAM WAS THE CALCULATION OF THE EFFECTS OF THE CROSS SECTIONS OF FISSION PRODUCT AND ACTINIDE NUCLEI, ACCUMULATING WITH BURNUP IN LIGHT WATER REACTORS, ON THE DOPPLER EFFECT. THE FINAL PARAMETER CALCULATED IN THE PROGRAM WAS NOT THE DOPPLER EFFECT FOR A CORE OR A REALISTIC FUEL ASSEMBLY, BUT PARAMETERS RELATED TO A CHANGED IN ABSORPTION WITH TEMPERATURE AS A FUNCTION OF BURNUP IN A UNIT FUEL PIN CELL. THE CALCULATIONS INDICATED THAT FOR A "TYPICAL" LWR FUEL PIN, THE ABSORPTION DOES NOT INCREASE MUCH WITH BURNUP (35,300 MWD/T), AND PERHAPS DECREASES SLIGHTLY, DEPENDING ON WHICH PARAMETER IS CONSIDERED MOST INDICATIVE. THIS IS POSSIBLY IN CONFLICT WITH EXPECTATIONS THAT THE DOPPLER EFFECT SHOULD INCREASE MORE AS A RESULT OF PU 240 BUILDUP (ALL ELSE EQUAL, E.G., FUEL TEMPERATURE).

*** NRR : IMPACT OF RESULTS ***

THE RESEARCH CALCULATIONS DO NOT GIVE DIRECTLY DOPPLER COEFFICIENTS FOR A REACTOR. THEY DO INDICATE THAT POSSIBLY SOME ANTICIPATED INCREASE OF DOPPLER EFFECT WITH BURNUP (VIA PU 240) MIGHT BE LESS THAN COMMONLY STATED. THIS IS NOT EXPECTED TO HAVE A SIGNIFICANT IMPACT ON NORMAL REGULATORY TRANSIENT AND ACCIDENT SAFETY ANALYSES. FOR A VARIETY OF REASONS, DEPENDING ON THE REACTOR EVENT, OR CONSERVATISMS USED IN THE CALCULATIONS, REGULATORY CALCULATIONS ARE NOT EXPECTED TO BE SENSITIVE TO DOPPLER EFFECTS IN HIGH BURNUP FUEL. THESE REASONS MAY INCLUDE GENERAL LACK OF SENSITIVITY TO DOPPLER COMPARED TO MODERATOR OR SCRAM REACTOR EFFECTS, USE OF CONSERVATIVE (LOWER) BOL (STATES AND) DOPPLER COEFFICIENTS, EVENTS FOR WHICH LARGE DOPPLER COEFFICIENTS ARE CONSERVATIVE, LOW RELATIVE POWER DENSITY AND REACTIVITY IN HIGH BURNUP FUEL ASSEMBLIES AFFECTING BOTH LOCAL EVENTS AND CORE WIDE DOPPLER WEIGHTING AND MAKING HIGH BURNUP FUEL UNIMPORTANT FOR MOST EVENT ANALYSIS. THUS, THE RESEARCH RESULTS ADD TO THE GENERAL KNOWLEDGE OF THE STAFF, BUT DO NOT APPEAR TO REQUIRE DIRECT APPLICATION AT THIS TIEM. HOWEVER A QUESTION WILL BE SENT TO THE REACTOR VENDORS ASKING THEM TO REVIEW THE INFORMATION (IMPACT OF RESULTS CONTINUED NEXT SECTION)

*** NRR : COMMENTS AND REMARKS ***

IMPACT OF RESULTS - CONTINUED - IN THE RESEARCH REPORT (AND THE EPRI REPORT) AND TO RESPOND AS TO HOW THEIR CALCULATIONAL METHODS TREAT FISSION PRODUCT AND ACTINIDE RESPONANCE REGION ABSORPTION COMPETITION AND RESONANCE INTERFRENCE EFFECTS AND TO THE POSSIBLE NEED TO ALTER METHODS OR COEFFICIENT DETERMINATION OR SELECTION.
- START NRR COMMENTS AND REMARKS - THE RESEARCH PROGRAM IS NOW TERMINATED AND NO FURTHER WORK IS RECOMMENDED. THE TASK OF RELATING THE POSSIBLE EFFECTS INDICATED IN THE RESEARCH CALCULATIONS TO REACTORS AND THE METHODS, DETERMINATIONS AND SELECTION OF SUITABLE DOPPLER EFFECTS FOR VENDOR SAFETY CALCULATIONS IS BEST DONE VIA QUESTIONS TO THE VENDORS. COMPLETION OF THE INFORMATION PROCESS WILL PROCEED IN THAT DIRECTION. SINCE NO SIGNIFICANT CHANGE IN THE VALUES USED IN SAFETY ANALYSES IS PRESENTLY CONTEMPLATED, THERE IS NO INDICATION THAT THE RESEARCH RESULTS CONTAIN INFORMATION THAT SHOULD BE CONSIDERED FOR BOARD NOTIFICATION.

BEST DOCUMENT AVAILABLE

RIL NO: 81-119 **DATE ISSUED**: 04/14/81 **RIL TITLE**: DEVELOPMENT OF BEST-ESTIMATE COMPONENT CODE

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A7027	ANALYTICAL RES IN LWR SAFETY		LEE T

RIL SUBJECT/DESCRIPTION

DEVELOPMENT OF BEST-ESTIMATE COMPONENT CODE K-FIX (3D, FLX)

RES COMMENTS

K-FIX (3D, FLX) IS A VALUABLE CALCULATIONAL TOOL FOR ADDRESSING THE GENERIC ISSUE A-2, EFFECT OF ASYMMETRIC BLOWDOWN LOADS ON VESSEL SUPPORTS AND VESSEL INTERNALS." THIS CODE, ALONG WITH HDR TEST RESULTS, CAN ALSO BE USED FOR AUDITING AND ASSESSING VENDOR CALCULATIONS OF BLOWDOWN LOADS. K-FLX (3D, FLX) CAN BE USED EITHER WITH OR WITHOUT FLUID-STRUCTURE COUPLING TO ASSESS THE VENDOR CODES THAT EITHER DO OR DO NOT INCLUDE THIS EFFECT.
ORIGINATOR: L. SHOTKIN

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: 05/11/81 ACTUAL RESP. DATE: 05/11/81 USER OFFICE REVIEWER: E. D. THROM/ J. J. W

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE NRC WAS INFORMED ON 5/7/75 OF NEWLY IDENTIFIED ASYMMETRIC LOADINGS WHICH COULD ACT ON THE REACTOR'S PRIMARY SYSTEM. THESE ASYMMETRIC LOADINGS RESULT FROM A POSTULATED DOUBLE-ENDED RUPTURE OF THE PIPING IN THE PRIMARY SYSTEM. THE MAGNITUDE OF THESE LOADINGS IS POTENTIALLY LARGE ENOUGH TO DAMAGE THE SUPPORTS OF THE REACTOR VESSEL, THE REACTOR INTERNALS, AND OTHER PRIMARY SYSTEM COMPONENTS. THE STAFF INITIATED A GENERIC STUDY, TAP A-2, TO GAIN A BETTER UNDERSTANDING OF THESE LOADS AND TO DEVELOP CRITERIA FOR THE EVALUATION OF THE RESPONSE OF THE PRIMARY SYSTEMS IN PWRS TO THESE LOADS. PART OF THE GENERIC STUDY WAS TO PERFORM AUDIT ANALYSES OF THE LICENSEE'S METHODS. THE STAFF UTILIZED THE WHAM/MOD 7 COMPUTER PROGRAM TO AUDIT THE ASYMMETRIC BLOWDOWN LOADS ON THE CORE SUPPORT STRUCTURE (BARREL). WHAM/MOD 7 IS A ONE-DIMENSIONAL, INCOMPRESSIBLE FLUID FLOW MODEL. THE STRUCTURAL-FLUID INTERACTION PROCESS IS NOT CONSIDERED. HOWEVER, THE STRUCTURAL-FLUID PROCESS IS AN IMPORTANT PART OF THE TRANSIENT ANALYSIS. THE K-FIX (3D, FLX) COMPUTER PROGRAM WAS DEVELOPED TO ADDRESS THIS PROCESS.

*** NRR : IMPACT OF RESULTS ***

THE DEVELOPMENT OF THE BEST-ESTIMATE COMPONENT CODE, K-FIX (3D, FLX) BY RES GIVES NRR THE NECESSARY TOOL TO PERFORM INDEPENDENT AUDIT ANALYSES FOR COMPARISON WITH LICENSEE METHODS. K-FIX (3D, FLX) WILL ALLOW THE STAFF TO PERFORM ANALYSES WHICH WILL BETTER QUANTIFY THE CONNSERVATISMS IN THE LICENSEE'S ANALYSES. IN ADDITION, K-FIX (3D, FLX) WILL PROVIDE NRR WITH A BETTER TOOL TO PERFORM ANALYSES, AND STUDY, THE EFFECTS OF FLUID-STRUCTURE INTERACTIONS, NON-EQUILIBRIUM FLOW SITUATIONS, MASS AND ENERGY RELEASE RATES FROM A REACTOR PRIMARY SYSTEM TO CONTAINMENT, AND ECC WATER INJECTION INTO A PWR DOWNCOMER.

*** NRR : COMMENTS AND REMARKS ***

NRR SHOULD REQUEST RES TO PLACE THE K-FIX (3D, FLX) COMPUTER PROGRAM ON THE INEL AND BNL COMPUTER SYSTEMS FOR ACCESS, AS REQUIRED. IN ADDITION, THE REQUIRED UPDATES TO RUN AN HDR ANALYSIS SHOULD BE PROVIDED AS A SEPARATE FILE, WITH THE ASSOCIATED DATA INPUT. THE REQUIRED SUPPORT DOCUMENTATION SHOULD ALSO BE PROVIDED AS A SINGLE PACKAGE TO ENABLE USE OF THE PROGRAM. THE REACTOR SYSTEMS BRANCH, DIVISION OF SYSTEMS INTEGRATION, SHOULD BE GIVEN LEAD RESPONSIBILITY ON THE K-FIX (3D, FLX) COMPUTER PROGRAM USE.

RIL NO: 81-120 **DATE ISSUED**: 04/13/81 **RIL TITLE**: 3-DIMENSIONAL THERMAL HYDRAULIC COMPUTER CODES

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**:

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A2045	3-D TIME DEP CODE DEV		WOOD P

RIL SUBJECT/DESCRIPTION

3-DIMENSIONAL THERMAL HYDRAULIC COMPUTER CODES

RES COMMENTS

THIS RIL DESCRIBES THE COMMIX (COMPONENT MIXING) FAMILY OF COMPUTER CODES AND DISCUSSES SOME OF THE APPLICATIONS OF THESE CODES.
ORIGINATOR: P. WOOD

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 06/05/81 USER OFFICE REVIEWER:

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE COMMIX FAMILTY OF CODES WAS DEVELOPED BY ANL FOR LMFBR THERMAL HYDRAULIC APPLICATIONS. THE FIRST VERSION, NOW COMMIX-1, WAS ORIGINALLY INTENDED AS A BENCHMARK CODE FOR DETAILED, 3-DIMENSIONAL STUDY OF NATURAL CONVECTIVE HEAT REMOVAL DURING A LOSS OF FORCED CIRCULATION ACCIDENT. A FASTER VERSION, COMMIX-1A IS CONSIDERED PRACTICAL FOR ENGINEERING DESIGN. THE APPLICABILITY TO LWRS AND GAS COLLED REACTORS HAS BEEN EXPLORED. COMMIX-1A HAS BEEN SATISFACTORILY TESTED AGAINST EXPERIMENTAL DATA ON SODIUM AND WATER SYSTEMS, AND CAN BE USED WITH CONFIDENCE WITH SINGLE PHASE FLOW. IT IS BEING USED FOR DESIGN PURPOSES IN HELIUM SYSTEMS BY GENERAL ATOMIC COMPANY, BUT HAS NOT BEEN TESTED BY EXPERIMENT. COMMIX-2 HANDLES TRANSIENT, 3-DIMENSIONAL, 2-PHASE FLOW. THE COMMIX CODES HAVE NO APPLICATION TO THE REGULATORY PROCESS AT PRESENT. THERE IS NO LICENSING ACTIVITY FOR LMFBRS, AND LWR NEEDS ARE ADEQUATELY MET BY EXISTING CALCULATIONAL TOOLS. AS THESE IS NO EXPERIMENTAL VERIFICATION FOR USE IN HELIUM SYSTEMS, IT IS NOT SUITABLE FOR HTGR LICENSING ACTIVITIES.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THE AVAILABILITY OF THE COMMIX CODES HAVE NO PRESENT IMPACT ON REGULATORY ACTIVITIES. IF LMFBR LICENSING IS RENEWED, COMMIX CODES MAY HAVE LIMITED USE FOR NATURAL CIRCULATION, SUBASSEMBLY FLOW, AND PLENUM STRATIFICATION/MIXING ANALYSIS. APPLICATIONS TO HTGR LICENSING WOULD REQUIRE VERIFICATION BY EXPERIMENT. THERE IS NO APPARENT IMPACT FOR LWR LICENSING.

*** NRR : COMMENTS AND REMARKS ***

1. THE COMMIX CODES CAN BE CLASSIFIED AS DESIGN TOOLS. IF THERE IS A NEED FOR FURTHER DEVELOPMENT AT PRESENT, IT SHOULD BE PURSUED BY THE NUCLEAR INDUSTRY. IN THE EVENT LMFBR LICENSING BECOMES ACTIVE, THE NEED FOR FURTHER RES DEVELOPMENT SHOULD BE REVIEWED.

THE USE IN HELIUM APPLICATIONS IS CAUTIONED BECAUSE NO EXPERIMENTAL VERIFICATION HAS BEEN PERFORMED. THE CODE HAS BEEN DEVELOPED FROM LAMINAR FLOW THEORIES AND VALID ALGORITHMS FOR ITS EXTENSION TO THE TURBULENT FLOWS (THE REGIME OF MOST INTEREST) CANNOT BE VERIFIED ANALYTICALLY.

RIL NO: 81-121 **DATE ISSUED**: 05/27/81 **RIL TITLE**: CORCON MOD 1 COMPUTER MODEL

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A1019	MOLTEN FUEL-CONCRETE INTERACTIONS		BURSON B

RIL SUBJECT/DESCRIPTION

CORCON MOD 1 - AN IMPROVED COMPUTER MODEL FOR THE INTERACTION BEHAVIOR OF MOLTEN CORE MATERIALS WITH CONCRETE

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF COMPLETED RESEARCH ON THE INTERACTION OF MOLTEN CORE MATERIALS WITH REACTOR CAVITY CONCRETE. SPECIFICALLY, THIS RIL DESCRIBES THE ADVANCED MELT/CONCRETE INTERACTIONS CODE - CORCON MOD 1. THIS CODE PROVIDES THE NRC WITH THE BEST AVAILABLE TOOL FOR EVALATING THE MELT/CONCRETE INTERACTION PHASE OF POSTULATED CORE MELT ACCIDENTS. RES RECOMMENDS THAT NRC STAFF AND NRC CONSULTANTS USE THE CORCON MOD 1 CODE FOR FUTURE ANALYSIS OF THE INTERACTION OF MOLTEN CORE DEBRIS WITH CONCRETE AND THAT THE USE OF THE INTER CODE BE DISCONTINUED. CURRENT PLANS ARE TO ISSUE AN IMPROVED VERSION OF THE CORCON CODE (MOD 2) MID CY 982.
ORIGINATOR: R. SHERRY.

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 09/02/81 USER OFFICE REVIEWER: J. MEYER

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE NEED FOR THIS CODE DEVELOPED FROMAN INTEREST IN CORE-MELT PROGRESSION, IN PARTICULARY, IN THE THREATS TO CONTAINMENT INTEGRITY FROM OVERPRESSURIZATION AND BASEMAT PENETRATION WHICH RESULT FROM CORE/CONCRETE INTERACTIONS. SEVERE LIMITATIONS IN THE INTER SUBROUTINE OF MARCH PRECLUDED ITS USE IN LICENSING APPLICATIONS WITHOUT AN IMPROVED AND MORE DETAILED CODE CAPABILITY.

*** NRR : IMPACT OF RESULTS ***

THE CORCON-MOD 1 COMPUTER CODE WAS USED IN THE NRR ANALYSIS OF BASEMAT PENETRATION FOR CORE-MELT ACCIDENTS AT INDIAN POINT AS DOCUMENTED IN NUREG 0850. THIS ANALYSIS WILL SERVE AS PART OF THE BASES FOR TESTIMONY AT THE UPCOMING INDIAN POINT HEARING. THE CODE ENABLED THE STAFF TO BETTER ASSESS THE MOLTEN-CORE CONCRETE INTERACTIONS IMPORTANT IN DETERMINING CONTAINMENT BUILDING FAILULRE MODES, AND IN FORMULATING REQUIREMENTS FOR MITIGATION FEATURES.

*** NRR : COMMENTS AND REMARKS ***

THE PRESENT VERSION HAS SEVERAL DEFICIENCIES WHICH SHOULD BE REMEDIED IN FUTURE VERSIONS. THE MOST IMPORTANT TWO ARE ITS INABILITY TO ASSESS CORE/CONCRETE INTERACTIONS ONCE THE CORE MATERIALS RESOLIDIFY AND ITS INABILITY TO ANALYZE THE EFFECTS OF WATER THAT COULD BE PRESENT ON THE FLOOR OF THE REACTOR CAVITY. A MAJOR PORTION OF THE PENETRATION OF THE BASEMAT OCCURS WITH SOLID CORE MATERIALS. THESE DEFICIENCIES AND OTHER ARE DESCRIBED IN NUREG-0850.

RIL NO: 81-122 **DATE ISSUED**: 06/24/81 **RIL TITLE**: IMPEDANCE TESTING

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A6353	KUOSHENG SRV DISCHARGE & PIPING VIBRATION TESTS		O'BRIEN J

RIL SUBJECT/DESCRIPTION

IMPEDANCE TESTING AT THE KUOSHENG NUCLEAR POWER STATION

RES COMMENTS

THIS RIL TRANSMITS IMPEDANCE TEST DATA TO DETERMINE NATURAL FREQUENCIES, MODE SHAPES, AND DAMPING VALUES OBTAINED IN JANUARY 1981 AT THE KUOSHENG NUCLEAR POWER STATION IN TAIWAN. THIS INFORMATION IS USEFUL IN REVIEWING FSAR FOR SOME PLANTS IN THE UNITED STATES WWITH REGARD TO PERFORMANCE UNDER DYNAMIC ENVIRONMENTS SUCH AS SRV DISCHARGE AND EARTHQUAKES.
ORIGINATOR: J. O.BRIEN

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 08/25/81 USER OFFICE REVIEWER: G. KNIGHTON

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RESEARCH IS IN RESPONSE TO AN NRR REQUEST OF 11/6/80 TO OBTAIN DATA FRM THE JAN. 1981 IN-SITU IMPEDANCE TESTING PROGRAM AT THE KUOSHENG NUCLEALR POWER STATION IN TAIWAN. IMPEDANCE TESTS INVOLVE THE USE OF MECHANICAL EXITERS IN CONJUNCTION WITH SOPHISTICATED ELECTRONIC ANALYZERS WHICH BY MONITORING RESPONSES IN REAL TIME, PROVIDE THE SOUGHT AFTER DYNAMIC-RESPONSE CHARACTERISTICS. COMPONENTS TESTED WERE 1) 3-IN MOTOR-OPERATED VALVE, 2) JET PUMP INSTRUMENT PANEL, 3) RHR PUMP, 4) RECIRCULATION CONTROL VALVE, AND 5) 480-VOLT MOTOR CONTROL CENTER. IN-SITUTESTS ARE CONSIDERED AS CONTRIBUTING TO NRR IN A LIMITED MANNER. IMPEDANCE TESTING USEFUL IN DETERMINING DAMPING VALUES, NATURAL FREQUENCIES AND MODAL SHAPES OF EQUIPMENT AND SHOULD BE HELPFUL IN BENCHMARKING TOOLS. IT ALSO SUPPLIES SUPPORT FOR LICENSING CONCLUSIOINS FOR RELATIVELY LOW LEVELS OF EQUIPMENT EXCITATION. HOWEVER, IN CASES WHERE EQUIPMENT QUALIFICATION CANNOT BE ESTBLISHED BY ANALYSIS, IN-SITU TESTING OF THE TYPE REPORTED IS NOT TO BE CONSIDERED A SUBSTITUTE FOR ACTUAL TESTS DATA OBTAINED BY OTHER MEANS AT HIGHER LEVELS OF EXCITEMENT.

*** NRR : IMPACT OF RESULTS ***

1. THE RESULTS SHOULD BE CONSIDERED FOR USE AS A BENCHMARKING TOOL FOR THE DYNAMIC MODELING OF EQUIPMENT.
2. ALTHOUGH LIMITED, THE DATA SUPPORT FSAR REVIEWS FOR MARK III BWR S FOR LOWER LEVELS OF EQUIPMENT EXCITATION.
3. IN CASES WHERE EQUIPMENT QUALIFICATION CANNOT BE PERFORMED BY ANALYSIS, THE IMPEDANCE TESTING METHOD AS DESCRIBED IN THIS RESEARCH DOES NOT HAVE A DIRECT APPLICATION.

*** NRR : COMMENTS AND REMARKS ***

1. THE IMPEDANCE TESTING PROGRAM AT KUOSHENG IS COMPLETE. ITS VALUE FOR BENCHMARKING DATA SHOULD BE EXPLORED IN CONNECTION WITH FORTHCOMING NRR RESEARCH REQUEST IN THIS AREA.
2. THE PROGRAM IS AN EXAMPLE OF THE USE OF INTERNATIONAL COOPERATION TO OBTAIN DATA IN A TIMELY MANNER THAT MAY BE USEFUL FOR LICENSING PURPOSES.
3. THE RESEARCH RESULTS DO NOT CONTAIN INFORMATION WHICH SHOULD BE CONSIDERED FOR ASLB NOTIFICATION.

RESEARCH PROJECT CONTROL SYSTEM
RESEARCH RESULTS UTILIZATION REPORT
** ISSUED RILS **

RIL NO: 81-123 **DATE ISSUED**: 07/02/81 **RIL TITLE**: PERFORMANCE OF ELECTRICAL TERMINAL BLOCKS

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR, IE

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A1051	QUAL TESTING EVALUATION		FARMER W

RIL SUBJECT/DESCRIPTION

PERFORMANCE OF ELECTRICAL TERMINAL BLOCKS

RES COMMENTS

THIS RIL TRANSMITS A SUMMARY OF THE RESULTS OF A COMPLETED PORTION OF THE NRC QUALIFICATION TESTING EVALUATION (QTE) PROGRAM RELATING TO THE ADEQUACY OF CURRENTLY UTILIZED ELECTRICAL TERMINAL BLOCKS WHEN EXPOSED TOLOSS-OF-COOLANT ACCIDENT (LOCA) OR STEAM LINE BREAK CONDITIONS IN A REACTOR CONTAINMENT.

ORIGINATOR: R. FEIT (ICB:DFO) DOCUMENT ISSUED: NUREG/CR-1682 (FIN A1051).

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 10/06/81 USER OFFICE REVIEWER: D. REIFF/J.WATT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

IN JANUARY 1978, TESTS WERE PERFORMED BY FRANKLIN RESEARCH LABORATORIES FOR NORTHEAST UTILITIES TO VERIFY THE QUALLIFICATION OF TERMAL BLOCKS IN AN ACCIDENT ENVIRONMENT. UPON RECEIPT OF THE RESULTS OF THESE TESTS, THE IE SENT BULLETIN 78-02 TO ALL LICENSEES DESCRIBING THE TEST FAILURES AND SPECIFYING ACTIONS TO BE TAKEN BY LICENSEES, INCLUDING A REQUIREMENT TO DESCRIBE CORRECTIVE ACTIONS TO THE COMMISSION. AS A RESULT OF THIS AND OTHER INDUSTRY TESTING, NRC REQUIRED EXTENSIVE REPLACEMENT AND MODIFICATION OF ELECTRICAL CONNECTING METHODS (E.G., TERMINAL BLOCKS AND CONNECTORS) FOR A NUMBER OF FACILITIES WHERE DEFICIENCIES EXISTED. ABOUT 600 TERMINAL BLOCKS AT TMI-2 WERE REPLACED. THE TMI-2 ACCIDENT SUSTAINED INTEREST IN THIS AREA WITH THE NRC QUALIFICATION TESTING EVALUATION PROGRAM PERFORMING ADDITIONAL EXPERIMENTS DISCUSSED IN THE RIL.

*** NRR : IMPACT OF RESULTS ***

THE NEW INFORMATION PROVIDED IN THE RIL UNDERLINES THE IMPORTANCE OF DESIGN CONSIDERATIONS AND MAINTENANCE PROGRAMS IN THE PERFORMANCE OF TERMINAL BLOCKS. THE RIL DID NOT RESULT IN ANY CHANGED IN THE PREVIOUSLY ESTABLISHED NRC POSITION AND PRACTICE. THE RESULTS ARE, HOWEVER, BEING CONSIDERED AS BACKGROUND DINFORMATION IN THE ONGOING ENVIRONMENTAL QUALIFICATION REVIEWS AND RULEMAKING.

*** NRR : COMMENTS AND REMARKS ***

WE AGREE WITH THE FIRST RECOMMENDATION OF THE RIL THAT NEW PLANTS MUST NOT HAVE EXPOSED TERMINAL BLOCKS INSIDE OF CONTAINMENT. WE DO NOT ENDORSE THE RIL RECOMMENDATION REQUIRING EITHER ELIMINATION OF TERMINAL BLOCKS INSIDE CONTAINMENT OR USING HERMETICALLY SEALED ENCLOSURED, BECAUSE THE TEST DATA DOES NOT DEMONSTRATE THIS A NECESSARY REQUIREMENT. THE FAILURES REPORTED WERE SPECIFIC TO CERTAIN DESIGNS, HENCE THE CONCLUSIONS AND PROBABILITY ESTIMATED ARE NOT ADEQUATELY SUPPORTED. THE USE OF TERMINAL BLOCKS INSIDE CONTAINMENT SHOULD BE AN OPTION OF THE APPLICANTS. TERMINAL BLOCKS MAY BE REQUIRED FOR PERIODIC CALIBRATION, TEST AND CHECKING AND, IN SOME CASES, REPRESENT GOOD ENGINEERING PRACTICE. NRC, THEREFORE, REQUIRES QUALIFICATION OF ALL ELECTRIC CONNECTIONS, CABLE SPLICES AS WELL AS TERMINAL BLOCKS, FOR ACCIDENT CONDITIONS. AS LONG AS THE QUALIFICATION TEST DEMONSTRATES THAT THE EQUIPMENT WILL PERFORM ITS INTENDED FUNCTION IN THE ACCIDENT ENVIRONMENT, NO ADDITIONAL RESTRICTIONS ARE PLACED ON THE DESIGN OF THE EQUIPMENT. WE DO NOT AGREE WITH THE SANDIA CONCLUSION WHICH SSTATES THAT THERE IS A 14% PROBABILITY OF FAILURE OF ENCLOSED TERMI-
WE DO NOT AGRE WITH THE SANDIA CONCLUSION WHICH STATES THAT THERE IS A 14% PROBABILITY OF FAILURE OF ENCLOSED TERMINAL BLOCKS FOR 1978. FOUR FAILURES WERE CITED IN THE FRL REPORT. THREE OCCURRED IN THE TERMINAL BLOCKS ENCLOSED IN ALUMINUM BLXES. ONE OCCURED
FAILURES WERE CITED IN THE FRL REPORT. THREE OCCURRED IN THE TERMINAL BLOCKS ENCLOSED IN ALUMINUM BOXES. ONE OCCURRED BECAUSE USE OF ALUMINUM INSIDE CONTAINMENT IS MINIMIZED. FAILURE BECAUSE OF OVERTIGHTENING THE MOUNTING SCREW IS A RANDOM FAILURE AND COULD OCCUR IN ANY INSTALLATION. THIS LIMITED TESTING IS INSUFFICIENT BASIS TO SUPPORT THE CLAIM THAT TERMINAL BLOCKS ARE THE
IN ANY INSTALLATION. THIS LIMITED TESTING IS INSUFFICIENT BASIS TO SUPPORT THE CLAIM THAT TERMINAL BLOCKS ARE THE "WEAKEST LINK" I ROLE ASSURING PERFORMANCE OF EQUIPMENT REQUIRED TO MITIGATE THE CONSEQUENCES OF POSTULATED ACCIDENTS.

RESEARCH PROJECT CONTROL SYSTEM
RESEARCH RESULTS UTILIZATION REPORT
** ISSUED RILS **

RIL NO: 81-124 **DATE ISSUED**: 10/20/81 **RIL TITLE**: CONTROL ROOM ALARMS AND ANNUNCIATORS

RESEARCH REVIEW GROUP NO.: **SPONSORING OFFICE(S)**: NRR, IE

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A6119	HUMAN FACTORS REVIEWS		JENKINS J

RIL SUBJECT/DESCRIPTION

CONTROL ROM ALARMS AND ANNUNCIATORS

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF RESEARCH RELEVANT TO THE DISPLAY AND UTILIZATION OF CONTROL ROOM ALARM AND ANNUNCIATOR SYSTEMS. THE RESEARCH IS PART OF TASK I.D.4.A(1) OF THE TMI ACTION PLANT. DETAILED DOCUMENTATION IS PRESENTED IN NUREG/CR-2147, "NUCLEAR CONTROL ROOM ANNUNCIATORS: PROBLEMS AND RECOMMENDATIONS"
ORIGINATOR: J. JENKINS

BEST DOCUMENT AVAILABLE

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 11/12/81 USER OFFICE REVIEWER: PETER WILLIAMS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RIL REPORTS ON A STUDY PERFORMED bY EG&G AND DOCUMENTED IN NUREG/CR-2147, "NUCLEAR CONTROLROOM ANNUNCIATORS: PROBLEMS AND RECOMMENDANTIONS," SEPTEMBER L981. THE STUDY INVESTIGATED ANNUNCIATOR SYSTEMS AT FOUR REACTORS, INCLUDING TWO COMMERCIAL PRESSURIZED LIGHT WATER REACTORS. THE INVESTIGATION LED TO OBSERVATIONS OFO POOR PRACTICES IN ANNUNCIATOR DESIGN, LOCATION, GROUPING, LEGIBILITY, LABELING, FORMAT, AND ACOUSTICS. DIFFICULTIES WERE OBSERVED IN THE ANNUNCIATOR SYSTEMS ACHIEVING GOOD PRIORITY RECOGNITION AND OVERCOMING DISTRACTIONS, AND IN PROVISINS FOR PROPER MAINTENANCE. THE STUDY RECOMMENDED SEVERAL NRC ACTIONS INCLUDING THE DEVELOPMENT OF DESIGN STANDARDS AND SPECIFICATIONS, HUMAN FACTORS TRAINING FOR NRC INSPECTORS, AND THE DEVELOPMENT OF REQUIREMENTS AND PLANS FOR ANNUNCIATOR UPGRADING BY INDUSTRY. LONG-TERM RECOMMENDATIONS DEALT WITHDEVELOPMENT OF TOOLS, INCLUDING COMPUTER SYSTEMS, TOASSIST THE OPERATOR IN PERFORMING AND PRIORITIZING RESPONSES.

*** NRR : IMPACT OF RESULTS ***

THIS RIL AND NUREG/CR-2147 PROVIDE SUPPROT FOR THE GUIDELINES FOR ANNUNCIATOR WARNINGSYSTEMS GIVEN IN SECTION 6.3 OF NUREG-0700. THE NUREG IS ALSO USEFUL TO THE DESIGN OF ANNUNCIATOR SYSTEMS FOR NEW CONTROL ROOMS AND TO BOTH NRR AND RES IN PREPARING A FORMAL PLAN FOR FUTURE RESEARCH IN THIS AREA.

*** NRR : COMMENTS AND REMARKS ***

1. SPECIFIC AND SUBSTANTIVE AREAS OF RISK REDUCTION BY IMPROVED ANNUNCIATOR SYSTEMS SHOULD BE IDENTIFIED PRIOR TOCOMMITMENTS TO FURTHER RESEARCH AND TO THE FINALIZATION OF LICENSING STANDARDS. THESE IDENTIFICATIONS COULD BE APPROACHED BY USING PROBABILISTIC RISK ANALYSIS AND TASK ANALYSIS FINDINGS.
2. FUTURE RESEARCH PROGRAMS SHOULD BE SO STRUCTURED THAT RECOMMENDATIONS FOR NRC ACTIONS AND STANDARDS ARE ACCOMPANIED BY INFORMATION PERTAINING TO THE VALUE/IMPACT ASPECTS OF THE RECOMMENDATINO.

RIL NO: 81-125 **DATE ISSUED**: 09/11/81 **RIL TITLE**: TRAC-PD2, AN ADVANCED BEST ESTIMATE COMPUTER PROGRAM FOR PWR

RESEARCH REVIEW GROUP NO.: 0-00 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A7016	TRAC CODE DEVELOPMENT		SHOTKIN L

RIL SUBJECT/DESCRIPTION

TRAC-PD2, "AN ADVANCED BEST-ESTIMATE COMPUTER PROGRAM FOR PWR LOCA ANALYSIS"

RES COMMENTS

TRAC-PD2 IS CURRENTLY BEING APPLIED TO THE ANALYSISOF A VARIETY OF ACCIDENTS IN FULL-SCALE LWRS, INCLUDING LARGE-BREAK LOCA, SMALL BREAK LOCA AND OPERATIONAL TRANSIENTS. THE IMPROVEMENTS OF TRAC-PD2 OVER TRAC-PLA, EVALUATION OF THE CODE AND APPLICATTION OF THE CODE TO PROBLEMS OF INTEREST TO THE NRC ARE PRESENTED IN THIS RIL.
ORIGINATOR: L. SHOTKIN (AMB:DAE) DOCUMENT ISSUED:NUREG/CR-2054

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 10/06/81 USER OFFICE REVIEWER: W. JENSEN/J.WATT

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THIS RIL IS A STATUS REPORT IN THE DEVELOPMENT OF ADVANCED BEST-ESTIMATED COMPUTER PROGRAMS FOR PWR LOCA ANALYSIS. TRAC-P1A HAD BEEN REPORTED IN RIL #92. IMPROVEMENTS OF TRAC-PD2 OVER TRAC-P1A, AN EVALUATION OF TRAC-PD2, AND ITS APPLICATION TO PROBLEMS ARE PROVIDED. IT IS EXPECTED THAT THE NEXT VERSION, TRAC-PF1 WILL RECEIVE WIDER APPLICATION IN THE LICENSING PROCESS.

*** NRR : IMPACT OF RESULTS ***

A MILESTONE IN THE DEVELOPMENT OF A BEST-ESTIMATE ANALYSIS CAPABILITY FOR PWR LOCA ANALYSIS IS DOCUMENTED.

*** NRR : COMMENTS AND REMARKS ***

TRAC-PD2 IS DESCRIBED AS MUCH MORE RELIABLE AND SMOOTHER RUNNING THAN TRAC-P1A. RUNNING TIME IS THE SAME OR IMPROVED OVER P1A EVEN THOUGH THE REFLOOD HEAT-TRANSFER TREATMENT IS MORE COMPLEX.

RIL NO: 81-126 DATE ISSUED: 12/04/81 RIL TITLE: BWR SMALL BREAK TESTS

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	B3014	BWR-FIST FACILITY		BECKNER W

RIL SUBJECT/DESCRIPTION

BWR SMALL BREAK TESTS

RES COMMENTS

TESTS SIMULATING SMALL BREAK LOCAS IN A BOILING WATER REACTOR (BWR) WEWRE CONDUCTED IN THE TWO-LOOP TEST APARATUS. THESE TESTS WERE USED TO ASSESS CLCULATIONAL METHODS USED TO ANALYZE BWR TRANSIENTS AND PROVIDE INPUTTO OPERATOR GUIDELINES FOR RESPONSE TO TRANSIENTS. CALCULATIONS OF THESE TESTS WERE ALSO PERFORMED USING NRC DEVELOPED COMPUTER CODES. AREAS FOR IMPROVEMENT IN THE CALCULATIONAL METHODS HAVE BEEN IDENTIFIED.
ORIGINATOR: W. BECKNER

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 03/02/82 USER OFFICE REVIEWER: TIMOTHY COLLINS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PURPOSE OF THE RESEARCH WAS TO VERIFY FOR BWRS THE BASES USED TO DEVELOP EMERGENCYPROCEDURE GUIDELINES FOR LOSS OF FEEDWATER TRANSIENTS AND SMALL BREAK LOCAS. DETAILED EMERGENCY PROCEDURES FOR THESE EVENTS HAVE BEEN REQUIRED OF ALL LICENSEES AND OPERATING LICENSE APPLICANTS AS PART OF THE TMI ACTION PLAN. THIS RESEARCH PROVIDES THE DATA BASE NEEDED TO SUPPORT THE USE OF THE GUIDELINES FOR OPREPARING EMERGENCY PROCEDURES FOR NEARLY ALL BOILING WATER REACTORS.

*** NRR : IMPACT OF RESULTS ***

THE RESULTS OF THIS RESEARCH HAVE CONFIRMED THE VALIDITY OF THE ASSUMPTIONS USED IN THE DEVELOPMENT OF BWR EMERGENCY PROCEDURES GUIDELINES. THEYALSO INDICATE THAT SUBSTNATIAL CONSERVATISM IS INCLUDED IN THE CALCULATIONAL MODELS USED FOR BWR SMALL BREAK LOCA AND LOSS OF FEEDWATER EVENTS. COMPARISON OF THE DATA WITH APPENDIX K CALCULATIONS SHOWS A MARGIN OF 600 TO 700 DEGREES F IN PEAK CLADDING TEMPERATURE FOR SMALL BREAK EVENTS. THESE DATA HAVE BEEN USED TO SUPPORT STAFF TESTIMONY AT THE BLACK FOX AND ALLEN'S CREEK HEARINGS AND WILL BE USED IN THE DEVELOPMENT OF A BEST ESTIMATE TRANSIENT CODE FOR BWRS. GENERAL ELECTRIC HAS ALSO SUBMITTED A NEW ECCS EVALUATION MODEL FOR REVIEW AND APPROVAL. THE RESULTS OF THESE TESTS WILL BE AN IMPORTANT FACTOR IN REVIEWING THE CODE. APPROVAL OF THE REVISED GE MODEL WOULD RESULT IN MORE FLEXIBILITY IN CORE MANAGEMENT BECAUSE OF REDUCEDD THERMAL CONSTRAINTS. THIS WOULD, IN TURN, PERMIT MORE EFFICIENT PLANT OPERATION, AND WOULD APPLY TO NEARLY ALL BWRS.

*** NRR : COMMENTS AND REMARKS ***

TESTING TO QUALIFY THE EMERGENCY PROCEDURES GUIDELINES IS COMPLETE. ADDITIONAL TESTING IS PLANNED TO SUPPORT THE DEVELOPMENT OF A BEST ESTIMATE BWR AUDIT CODE. FACILITY MODIFICATIONS ARE IN PROGRESS TO ELIMINATE SEVERAL SCALING COMPROMISES AND SHOULD RESULT IN A SYSTEM RESPONSE MORE REPRESENTATIVE OF ACTUAL REACTOR BEHAVIOR FOR SMALL BREAK EVENTS AND TRANSIENTS. TESTS OF PARTICULAR INTEREST TO NRR INCLUDE THEH POWER TRANSIENT (ATWS) TESTS, THE LOSS OF FEEDWATER TESTS, AND THE STATION BLACKOUT TEST.

RIL NO: 81-127 **DATE ISSUED**: 12/04/81 **RIL TITLE**: HEAT TRANSFER AND HYDRAULICS DURING A BWR LARGE BREAK LOCA

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A4070	DOWNCOMER EFFECTS		REYES J
2.	B3014	BWR-FIST FACILITY		BECKNER W

RIL SUBJECT/DESCRIPTION

HEAT TRANSFER AND HYDRAULICS DURING A BWR LARGE BREAK LOCA

RES COMMENTS

RESULTS OF COMPLETED RESEARCH INVESTIGATING THE BWR LARGE BREAK LOCA ARE SUMMARIZED. THIS RESEARCH INVOLVED EXPERIMENTAL SIMULATIONS IN THE TLTA WHICH IS A FULL PRESSURE, SCALE MODEL OF A BWR USING A SINGLE ELECTRICALLY SIMULATED FUEL CHANNEL. THESE TESTS HAVE IDENTIFIED A LARGE DEGREE OF POTENTIAL CONSERVATISM IN THE BWR EVALUATION MODEL.
DOCUMENT ISSUED: NUREG/CR-2229, MARCH 1981, FIN B3014
ORIGINATOR: W. BECKNER

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 03/03/82 USER OFFICE REVIEWER: T. COLLINS

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PURPOSE OF THIS RESEARCH IS TO SIMULATE LARGE BREAK BWR LOCAS DURING THE BLOWDOWN, ECC INJECTION AND EARLY REFLOOD PHASES IN ORDER TO EVALUATE THE HEAT TRANSFER MODELS AND ASSUMPTIONS USED IN THE GE BWR EVALUATION MODEL. THE EVALUATION MODEL IS USED IN THE REGULATORY PROCESS TO SHOW COMPLIANCE WITH THE CRITERIA OF 10CFR50.46 REGARDING EMERGENCYCORE COOLING SYSTEMS. THE MODEL ITSELF MUST SATISFY THE CRITERIA OF APPENDIX K TO 10CFR50, "ECCS EVALUATION MODELS." THE RESULTS OF THIS RESEARCH CONTRIBUTE DIRECTLY TO THE DATA BASE SHOWING COMPLIANCE OF THE EVALUATION MODEL WITH APPENDIX K.

*** NRR : IMPACT OF RESULTS ***

THE RESULTTS OF THIS RESEARCH INDICATE THAT THE CURRENT E CCS EVALUATION MODEL IS CONSERVATIVE IN ITS CALCULATION OF PEAK CLADDING TEMPERATURE. HEAT TRANSFER COEFFICIENTS DETERMINED FROM THE TEST DATA ARE MUCH GREATER THAN THOSE ASSUMED IN THE EVALUATION MODEL, RESULTING IN A CONSERVATISM OF SEVERAL HUNDRED DEGREES F IN CLADDING HEATUP CALCULATIONS. THESE RESULTS HAVE BEEN USED TO SUPPORT STAFF TESTIMONY AT THE ALLENS CREEK AND BLACK FOX HEARINGS WITH REGARD TO THE ADEQUACY OF THE ECCS . IN ADDITION, GE HAS SUBMITTED A REVISED EVALUATION MODEL WHICH LESSENS SOME OF THE CURRENT MODEL CONSERVATISMS DEMONSTRATED BY THESE TESTS. APPROVAL OF THE NEW MODEL WOULD PERMIT MORE FLEXIBILITY IN CORE MANAGEMENT BECAUSE OF REDUCED THERMAL LIMITS AND THUS IMPROVING FUELEFFICIENCY AND OVER-ALL PLANT OPERATION. THESE BENEFITS WOULD BE APPLICABLE TO NEARLY ALL BWRS. IT IS EXPECTED THAT, BASED ON THIS RESEARCH EFFORT, AT LEAST SOME OF THE CURRENT CONSERVATISMS WILL BE RELAXED.

*** NRR : COMMENTS AND REMARKS ***

THE RESEARCH DISCUSSED HEREIN WAS PERFORMED USING A SINGLE HEATED BUNDLE. THE IMPACT OF THE RESULTS MUST BE WEIGHED AGAINST THE PHENOMENA OBSERVED IN THE MULTICHANNEL STEAM SECTOR TEST FACILITY. WE CONCUR, HOWEVER THAT THE EXISTING LARGE BREAK LOCA DATA BASE IS ADEQUATE FOR B WRS, AND THAT THE DATA SHOULD BE USED TO QUALIFY THE TRAC CODE FOR BEST ESTIMATE APPLICATIONS.

RIL NO: 81-128 **DATE ISSUED**: 12/08/81 **RIL TITLE**: PWR LOWER PLENUM REFILL RESEARCH RESULTS

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NRR

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A4048	STEAM-WATER MIXING/SYSTEM HYDRODYNAMICS		REYES J

RIL SUBJECT/DESCRIPTION

PWWR LOWER PLENUM REFILL RESEARCH RESULTS

RES COMMENTS

THIS RIL SUMMARIZES THE RESULTS OF THE LOWER PLENUM REFILL RESEARCH PERFORMED BY BATTELLE COLUMBUS LABORATORY AND CREARE, INC. IT EXTENDS RIL NO. 57. BEST ESTIMATED ECC BYPASS MODELS ARE PRESENTED IN THE APPENDIX TO THE RIL WHICH INDICATES THAT CURRENT LICENSING EVALUATION MODELS ARE CONSERVATIVE.

ORIGINATOR: J. REYES (EPB:DAE) DOCUMENT ISSUED: NUREG/CR-2106, 2030, 2085, 2058 (FINS A4048, A4070).

OFFICE: NRR IMPACT STATEMENT

SCHED. RESP. DATE: / / ACTUAL RESP. DATE: 03/30/82 USER OFFICE REVIEWER: G. N. LAUBEN

*** NRR : APPLICATION TO THE REGULATORY PROCESS ***

THE PURPOSE OF THIS RESEARCH WAS TO DEVELOP BEST ESTIMATE MODELS OF THE ECC BYPASS PHENOMENON DURING LARGE-BREAK LOCAS IN PRESSURIZED WATER REACTORS. THE SIMPLIFIED EMPIRICAL MODELS PRESENTED IN THE RIL PRESENT A CONVENIENT WAY TO OBSERVE TRENDS IN THE EXISTING DATA. ADDITION OF THE 1/5 SCALE DATA AND THE ASSOCIATED CORRELATION SHOW THAT SCALING STANDARDS PREVIOUSLY USED BY THE STAFF FOR END-OF-BYPASS AND ECC DELIVERY WERE CONSERVATIVE BUT NOT EXCESSIVE. THE DATA GENERATED THROUGH ALL THE EXPERIMENTAL BY-PASS PROGRAMS IS USED TO ASSESS THE MODELING CAPABILITIES OF NRC DEVELOPED CODES (RELAP, TRAC). THE DATA IS ALSO USED TO ASSESS THE CONSERVATISM OF VENDOR PROPOSED BY-PASS MODELS. AS EXPECTED THE LARGE-SCALE DATA SHOWS AN INCREASING EFFECT OF STEAM CONDENSATION AND A REDUCED EFFECT OF WALL HEAT.

*** NRR : IMPACT OF RESULTS ***

SINCE THE 1/5 SCALE RESULTS GENERALLY CONFIRM EXPECTED BEHAVIOR, WE DO DNOT PLAN ANY REVISION TO OUR SCALING STANDARDS FOR ECC BY-PASS MODELS. HOLDERS OF ECCS EVALUATION MODELS ARE ALWAYS AFFORDED THE OPPORTUNITY TO PROPOSED ECCS INJECTION MODELS WHICH ARE CONSISTENT WITHI APPENDIX K, THE BEST AVAILABLE DATA, AND APPROPRIATE SCALING METHODS. THE 1/5 SCALE DATA SET PROVIDES A BETTER BASIS FOR MODEL DEVELOPMENT AND ASSESSMENT OF ADVANCED CODES (RELAP5, TRAC). WE WOULD NOT ANTICIPATE MAKING CHANGES TO RELAP4 TO ACCOMMODATE THE NEW MODELS UNLESS IT WAS SHOWN TO BE REQUIRED FOR ASSESSMENT OF A PROPOSED VENDOR MODEL.

*** NRR : COMMENTS AND REMARKS ***

AS NOTED IN THE RIL, THIS CONCLUDES THE CREARE AND BCL EXPERIMENTAL PROGRAMS DEVOTED TO LOWER PLENUM REFILL AND ECC BYPASS.
TRANSIENT EXPERIMENTS PLANNED FOR 2D/3D WILL SIGNIFICANTLY INCREASE THE SCALE OF BYPASS DATA. ALSO TRANSIENT EXPERIMENTS ARE A MORE EXACTING TEST FOR COMPUTER MODELS. WE CONCUR IN THIS METHOD FOR OBTAINING ADDITIONAL BYPASS INFORMATION.
THIS RIL DOES NOT CONTAIN INFORMATION REQUIRING BOARD NOTIFICATION.

BEST DOCUMENT AVAILABLE

RIL NO: 82-129 **DATE ISSUED**: 02/05/82 **RIL TITLE**: THORIUM IN HUMAN TISSUES

RESEARCH REVIEW GROUP NO.: 0-00 **SPONSORING OFFICE(S)**: NMSS

PROJECTS INVOLVED

FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD

REFERENCE DATA WILL BE PROVIDED AT A LATER DATE

RIL SUBJECT/DESCRIPTION

THORIUM IN HUMAN TISSUES

RES COMMENTS

THIS RIL TRANSMITS THE RESULTS OF THE PROJECT,"THORIUM IN HUMAN TISSUES," CONDUCTED BYTHE INSTITUTE OF ENVIRONMENTAL MEDICINEOF NEW YORK UNIVERSITY. THE OBJECTIVES OF THE STUDY WERE TO DETERMINE THE DISTRIBUTION OF THE NATURALLY-OCCURRING ISOTOPES OF THORIUM IN THE HUMAN BODY AND TO SEE WHETHER INDIVIDUALS WHO LIVED INA TOWN HAVING URANIUM MILL TAILINGS HAD LEVELS OF TH-230 IN THEIR TISSUES GREATER THAN THE LEVELS IN THE TISSUES OF NON-EXPOSED INDIVIDUALS.

THE ORGAN DISTRIBUTION PATTERN OF THORIUM FOUND IN THS STUDY IS IN GOOD AGREEMENT WITH THAT RECENTLY ADOPTED IN ICRP NO. 30. RES COMMENDS THAT NMSS ADOPT THE ICRP 30 METHODOLOGY FOR INTERNALLY DEPOSITIED THORIUM.

ORIGINATOR: J. FOULKE (HE:HSWM) DOCUMENT ISSUED: NUREG/CR-1227 (FIN B-5756)

***** NO OFFICE IMPACT STATEMENTS *****

RIL NO: 82-130 DATE ISSUED: 03/16/82 RIL TITLE: EXPERIMENTAL VERIFICATION OF COMPUTER SIMULATIONS

RESEARCH REVIEW GROUP NO.: 0-00 SPONSORING OFFICE(S): NRR (RR-NRR-79-11)

PROJECTS INVOLVED

	FIN #	PROJECT TITLE	RES UNIT	RES. TECHNICAL LEAD
1.	A6306	HDR EVALUATION		O'BRIEN J

RIL SUBJECT/DESCRIPTION

EXPERIMENTAL VERIFICATION OF COMPUTER SIMULATIONS OF PIPING RESPONSE USING HEISSDAMPFREAKTOR SEISMIC TESTS

RES COMMENTS

THIS RIL DESCRIBES COOPERATIVE RESEARCH UNDERTAKEN BY THE USNRC AND KERNFORSCHUNGSZENTRUM KARLSRUHE. IT IS CONCLUDED AS A RESULT OF INSITU EXPERIMENTS CONDUCTED AT THE HEISSDAMPFREAKTOR UNDER HIGHLY CONTROLLED AND IDEALIZED SITUATIONS, THAT ADVANCED COMPUTER MODELS USED TO PREDICT NUCLEAR POWER PLANT PIPING RESPONSE MAY OVER- AND UNDERESTIMATE OBSERVED RESPONSE BY A FACTOR OF 2 OR GREATER.
ORIGINATOR: J.O'BRIEN, DET:MSEB DOCUMENTS ISSUED: NUREG/CR-1913, -2463 (FIN A-6306).

BEST DOCUMENT AVAILABLE

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16. ABSTRACT (200 words or less)

This report on "Research Results Utilization" provides status and control information concerning the utilization of research results in the regulatory policies and practices of the NRC. Research Information Letters (RILs) are prepared by RES to transmit research results to NRC user offices upon completion of a substantial, coherent and reasonably complete body of experimental and/or analytical research work. Section 3.0 of this report lists the RILs issued to date, together with an identification of the research program manager and the research program element which generated the RIL. The potential applicability of each RIL to the regulatory process is also identified here, and comments from the cognizant RES and user office staff are summarized which relate to the expected impact of the reported RILs on the regulatory process.

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221